NATIONAL CHILD SURVIVAL
AND SAFE MOTHERHOOD PROGRAMME

CONDUCT DISEASE SURVEILLANCE

Ministry of Health and Family Welfare
Government of India
New Delhi
1992

GOALS AND COMPONENTS OF NATIONAL CHILD SURVIVAL AND SAFE MOTHERHOOD PROGRAMME

GOALS

- **Infant mortality rate** reduced from 80 to 75 by 1995 and 50 by 2000.
- **Child (1-4 years) mortality rate** reduced from 41.2 to < 10 by 2000.
- **Maternal mortality rate** reduced from 400 to 200/100,000 by 2000.
- **Polio eradication** by 2000.
- **Neonatal tetanus elimination** by 1995.
- **Measles** - prevention of 95% deaths and 90% cases by 1995.
- **Diarrhoea** - prevention of 70% deaths and 25% cases by 2000.
- **Acute respiratory infections** - prevention of 40% deaths by 2000.

Components of this package would be:

Children

Newborn care at home - warmth and feeding.
Primary immunization by 12 months - 100% coverage
Vitamin A prophylaxis (9 months to 3 years) - 100% coverage
Pneumonia - Correct case management at home/health facilities.
Diarrhoea - Correct case management at home/health facility; ORS in every village.

Pregnant Women

Immunization against tetanus - 100% coverage
Anaemia prophylaxis and oral therapy - 100% coverage
Ante-natal check-up - at least 3 check-ups in 100%
Referral of those with complications
Care at birth - promotion of **clean** delivery
Birth timing and spacing

CONDUCT DISEASE SURVEILLANCE

ADAPTED FROM WHO MODULE

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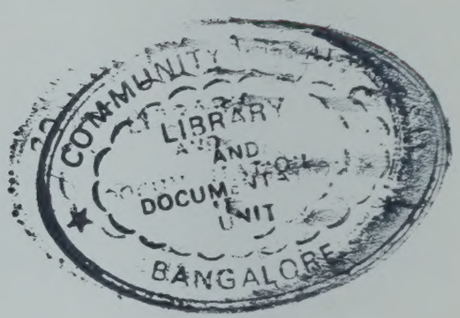
Published by :

Ministry of Health & Family Welfare
Government of India
Nirman Bhawan
New Delhi.



First Published	1985
Revised	1986
Revised	1987
Revised	1988
Revised	1989
Revised	1990
Revised	1992

This publication is available in English only

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CONDUCT DISEASE SURVEILLANCE

INTRODUCTION

Surveillance is collection of data for action. By collecting information about cases and deaths and by analyzing the data you can determine what action is needed to reduce number of cases and deaths. Surveillance data are also used to:

* see if the **fixed day strategy** for delivery of child survival and safe motherhood interventions is being implemented ;

* evaluate impact of immunization services on the occurrence of vaccine-preventable diseases in the community;

* evaluate impact of safe motherhood services on maternal deaths and quality of care during delivery;

* establish disease priorities which shall include vaccine-preventable diseases as well as other diseases contributing to deaths in children below five years such as diarrhoea and pneumonia;

* identify specific population groups at higher risk of illness and death from vaccine-preventable diseases, diarrhoea and pneumonia to ensure that immunization activities as well as other services and resources can be used efficiently;

* observe disease trends and identify causes of maternal deaths as well as deaths in children below five years. This is necessary to plan immunization services, safe motherhood and child survival programmes;

* identify, investigate and control outbreaks or epidemics.

Information on diseases and deaths related to child survival and safe motherhood programme is collected from three main sources in our country i.e. from Mother-Infant immunization card, health worker's mother and child care record and monthly reports from primary health centre as well as hospitals. Apart from disease surveillance, other information which are crucial for implementation of child survival and safe motherhood programme include those related to the implementation of the fixed day strategy, coverage with immunization, vitamin-A and anaemia prophylaxis and select ante-natal services, supply of vaccines as well as vitamin-A concentrated solution and iron and folic acid tablets, maintenance of equipment, transport, cold chain equipment, occurrence of untoward reactions following immunization.

Action should be taken at the level at which data is collected. This is especially true for health centres, since it is at this level that most health services are provided. **If medical officers of health centres wait** for receiving feedback from district or state before taking any action, **it may be too late.**

LEARNING OBJECTIVES

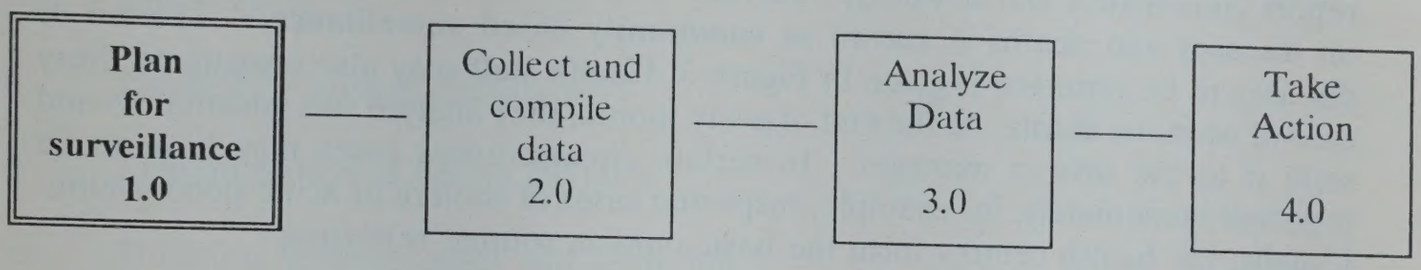
You will acquire and practice skills which will enable you to conduct surveillance activities for various vaccine preventable diseases, diarrhoea, pneumonia and investigate neonatal and maternal deaths as well as cases of acute poliomyelitis.

You will also be able to line-list cases of poliomyelitis as well as neonatal and maternal deaths.

You will, in this module, learn to collect, analyze and present data in the form of charts, graphs and maps and take action including giving feed-back on the basis of your findings.

You will also learn procedures you will have to undertake in the event of outbreaks of diseases you aim to prevent through various interventions of the child survival and safe motherhood programme.

1.0 PLAN FOR SURVEILLANCE



In this section, you will learn about different types of surveillance systems as well as various activities you will have to undertake regularly. You will also learn how to assess whether your surveillance system is organized well so that you may collect information that is timely, complete and accurate.

1.1 WHAT ARE THE TYPES OF SURVEILLANCE?

There are two major types of surveillance systems that will be described in this chapter:

- Routine reporting
- Sentinel reporting

In addition, there are other types of studies that need to be undertaken:

- Case/outbreak investigations
- Special studies - morbidity/mortality surveys

1.1.1 Routine reporting

This is the simplest and most widely practiced method of collecting information. It includes both active and passive surveillance. All cases attending out patients' department (OPD) are recorded in a register. You may keep a tally sheet as shown in Fig 4. This will be particularly useful if there is heavy attendance in your OPD and a large number of cases are seen. The health staff collect information during their field work about the number of cases of diseases which have to be reported for the purpose of this programme.

The health workers will report occurrence of diseases and deaths in their sub-centre area. This information will normally be collected by the workers through a **system of informants in every village** and urban unit. The health workers during their home visits will include in their 'priority houses' the list of houses where various events such as vital events - births, deaths as well as diseases have occurred. Normally, such

information is noted in the daily dairy of the Health worker and a consolidated report sent to the Medical officer in-charge of the Primary Health Centre. However, when any disease or deaths are occurring more often than usual, the worker will send a report immediately and at weekly intervals. This system of collection of information on diseases and deaths is known as **community based surveillance.** The list of diseases to be reported is given in Figure 3. Health staff may also investigate every case of neonatal death. At the end of every month, they analyze this information and send it to the district manager. In certain circumstances cases may have to be reported immediately, for example, suspected cases of cholera or acute poliomyelitis. Usually, the health centres form the basic units in routine reporting.

In this module you will learn about reporting of cases of various diseases. If you are a district manager/health officer, you will also collect data on deaths due to various vaccine preventable diseases including neonatal tetanus, diarrhoea and pneumonia in addition to maternal deaths from hospitals in your district.

SUGGESTED REGISTER FORMAT FOR RECORDING CASES AT OPD

Serial No.		3	4	5	6	7	8	9	10	11
1 Annual	2 Monthly	Name of the child/ mother	Father's/ Husband's name	Address	Date of birth/ age in years	Sex	Diagnosis	Date of onset	Immuni- zation status	Result/ Outcome

Fig. 1 : A sample register format for use in the out-patients department.

Routine reports may give an incomplete picture of the total number of cases of disease actually occurring in an area. Some of the reasons for incomplete reporting could be:

- o Mild disease
- o Treated by private practitioner
- o Low utilization of health facilities
- o Duration between onset and death low
- o irregular reporting by health facility
- o partial reporting by health facility

1.1.2 Sentinel reporting

In **SENTINEL REPORTING** only a small number of reporting units are selected to participate e.g. district hospitals, paediatrics and obstetrics departments of medical colleges, etc,.

The criteria for selection of sentinel centres for such surveillance include :

- o Large number of cases with these diseases will be seen
- o Fairly accurate diagnosis of the diseases is possible due to the specialist's intervention and use of support services
- o The accuracy of reporting will be better.
- o Additional information such as number of cases by age groups and their protection levels will be collected.

When we collect data on deaths, we use hospitals as sentinel sites, since hospitals are likely to have deaths occurring there. However, using this source alone might give an artificially high case fatality rate because usually the most severe cases are hospitalized. There should be a close liaison between the sentinel centres and the local health office. Follow up action on reports, when indicated, should be immediate. The sentinel centres provide you useful information and also serve as effective "watch-dogs or sentinels" for you. You will get an early warning if things go wrong in your area.

Since sentinel reporting provides data on parts of the population only whose representativeness is not known, incidence rates for the entire area served cannot be automatically extrapolated from sentinel data.

1.1.3 Case/outbreak investigations

CASE/OUTBREAK INVESTIGATIONS are attempts to identify why case(s) of disease occurred. The purpose of these investigations are to:

* confirm diagnosis;

* determine why the outbreak occurred;

* initiate the most appropriate control measures;

* identify where and to whom to apply these measures;

* prevent similar outbreaks in the future.

In general, "case investigation" is investigation of a single case and an "outbreak investigation" is investigation of many cases. However, when the occurrence of a particular disease is either very low, or is expected to be very low due to high levels of immunization/protection, even one case can be considered an "outbreak" e.g. poliomyelitis..

As a medical officer of a health centre or a district, you should arrange for investigation of every case of neonatal deaths as soon as possible. Similarly, cases of poliomyelitis should also be investigated immediately. Further, if many cases of gastroenteritis occur within a short period or a typical case of cholera is reported, you must investigate immediately.

The role of a health centre or district supervisor in most outbreak investigations is to analyze surveillance data, initiate control measures and notify higher officials of disease trends that might indicate an outbreak of a disease.

1.1.4 Special studies

SPECIAL STUDIES are conducted by trained health staff, investigators or epidemiologists. They are used to

* measure the number of cases of disease as well as deaths in an area and

* to evaluate reliability of routine or sentinel reporting.

For example, a morbidity and mortality survey may be a better method for diseases that tend not to be seen at health facilities for geographical or cultural reasons (such as neonatal tetanus). In special studies, the sample size, methodology, questionnaires and forms are designed to avoid bias and misinterpretation of data.

Community-based, surveys may be necessary in some cases. However, these surveys are expensive and require specially trained personnel. For this reason, the decision to conduct one is usually made at the national or state level. However, health centre and district level managers may be asked to participate in these surveys e.g. sample surveys conducted on Poliomyelitis and Tetanus in 1981-82 and the National EPI Review in 1989.

Various surveillance methods are complementary and meet different health service needs. Data best suited to be collected by different methods are shown in figure 2 below.

Method		Information collected
I	Community based surveillance	Illness/Deaths due to Vaccine Preventable diseases, diarrhoeal diseases including dysentery, Pneumonias and Vital events through a system of village based informants
II	Routine reporting system	Illness/Deaths due to Vaccine preventable diseases, diarrhoeal diseases including dysentery, Pneumonias and Vital events based on the information at PHC/ reporting unit's and the community based surveillance Coverage levels
III	Sentinel reporting system	Illness/Deaths for the diseases mentioned above Age, sex, address and immunization and Vitamin A protection levels
IV	Case/outbreak investigation	Illness/Deaths for the above diseases Age, sex, address, immunization status, extent of outbreak, clinical symptoms, probable reasons for outbreak
V	Special studies	Illness/Deaths and the causes of death, socio-economic data and risk factors

Figure 2 : Data collected by different surveillance methods

EXERCISE A

The purpose of this exercise is to review information that has been presented so far. Several questions about disease surveillance are listed below. Answer each question by referring to the text on Pages 3-7, if necessary. Write your answer in the space provided below each question.

1. What information on cases of disease does a health centre medical officer include in his monthly report to the district health officer?

2. List four reasons for incomplete reporting in routine reporting sites.

3. What additional information, other than the number of cases of disease, does a sentinel site report?

4. What are the major purposes of a case/outbreak investigation?

5. In what way are health centre and district health officers involved in an outbreak investigation?

6. When would a special study be conducted? Give one example.

See the facilitator when you are ready to discuss your answers

1.2 ASSESS YOUR SURVEILLANCE SYSTEM

1.2.1 What should be reported?

Given below is the extract A on surveillance from the monthly report for a PHC or district.

A. SURVEILLANCE

Disease		Number Reported			
		For the Month		Cumulative since April	
		Cases	Deaths	Cases	Deaths
Diphtheria					
Pertussis					
Neonatal Tetanus					
Tetanus (others)					
Poliomyelitis (Acute)					
Measles					
Under 5 years	Tuberculosis				
	Pneumonia				
	Acute Diarrhoea				
	Dysentery				
Maternal Deaths (Reported) : Before delivery : During delivery : Within 6 weeks of delivery				[redacted]	

Figure 3 : Extract on Surveillance from Monthly Report

The information collected should be only as much as will be used.

* Routine reporting sites should report the total number of cases of each disease only

* Sentinel sites should report in addition, the age and immunization status.

Please note that while surveillance for cases and deaths due to tuberculosis, pneumonia, acute diarrhoea and dysentery is for children under 5 years, you will report all cases and deaths (all ages) due to other vaccine preventable diseases included in this form.

1.2.2 Which sources of data will be used?

Sources of information include dispensary, subcentre, PHC, hospital, private practitioners and health workers.

Report all new cases. Avoid duplication of reporting. Count only those cases which have been diagnosed by a health worker. The following cases should be counted·

* All cases and deaths confirmed by the health worker based on the information obtained through the informants as a part of the community based surveillance strategy;

* All cases seen and diagnosed by health workers at outreach sessions;

* Cases which come to the health centre for treatment;

* Cases seen and treated in medical college hospitals, district and sub-district hospitals,

* Cases treated at non-government health facilities (for example, mission hospitals or private physicians);

When you or your supervisory staff visit villages for supervision, be sure to ask about cases of measles, neonatal tetanus, poliomyelitis, diarrhoea and pneumonia as they are often left out while reporting.

1.2.3 What information is recorded on the patient register?

Whatever may be the format of register you are using ensure that following information is recorded : name, complete address, disease, age, sex. A sample format is given in figure 1 (page 4).

1.2.4 Which forms will be used to report data?

Health centres and district offices should use the following forms:

* Disease surveillance portion of monthly report;

* Individual case investigation forms (e.g. Neonatal and maternal deaths, poliomyelitis and diarrhoea/ cholera);

* Line lists for poliomyelitis, neonatal and maternal deaths.

1.2 5 When will reports be submitted?

Under the child survival and safe motherhood programme routine surveillance reports should be submitted every month. However, outbreak reports in case of occurrence of poliomyelitis, neonatal deaths and diarrhoea should be sent as soon as these outbreaks occur. (See section 5.0)

Surveillance section of monthly report should be filled even if there are no cases to report. This is known as "**zero reporting**".

1.2.6 What do health workers require training for?

As a medical officer, you should train health workers to conduct various surveillance activities. Health workers should be able to:

* understand the purpose of surveillance;

* recognize diseases you are to prevent or control using standard case definitions;

* know how to use various records/registers in the health system; and

* know what actions are subsequently needed.

Recognizing cases of diseases which you will aim to prevent under the programme is an important surveillance task for a health worker. Since not all health centres have access to laboratories, it is often necessary to diagnose cases on the basis of symptoms only. Therefore, all staff members should know the important symptoms of all diseases under surveillance and be able to make a fairly accurate diagnosis.

The chart in the next few pages lists the case definitions and the most common symptoms of the diseases included in the programme.

A. THE VACCINE PREVENTABLE DISEASES

DISEASE	LAY DEFINITION (suspected)	STANDARD CASE DEFINITION (Probable diagnosis)
Measles	History of fever and rash and any one of the following : cough running nose red eyes	History of a generalized blotchy rash lasting 3 or more days History of fever and history of any one of the following : cough, running nose, red eyes
Poliomyelitis	History of sudden onset of weakness and paralysis of the leg(s), and/or arm(s) and/or trunk AND history that paralysis was not present at birth or associated with serious injury or mental retardation. History of fever History of no progression of paralysis after the first 3 days AND History that acute paralysis was not present at birth or associated with serious injury or mental retardation/other diseases	A case of poliomyelitis is defined as any patient with acute flaccid paralysis (including any child less than 15 years of age diagnosed to have Guillain Barre syndrome) for which no other cause can be identified : Typical findings on physical examination : o acute flaccid paralysis o no sensory loss o muscle tenderness o wasting of the affected muscles (late findings) o absent or depressed deep tendon reflexes o asymmetrical findings.
Diphtheria	Sore throat, with grey patch or patches in the throat	Acute pharyngitis, acute nasopharyngitis, or acute Laryngitis, with a pseudomembrane.
Neonatal Tetanus	History of normal suck and cry first two days of life AND History of onset of illness between 3 and 28 days of life AND History of inability to suck followed by stiffness and/or jerking of muscles.	History of normal suck and cry for the first 2 days of life and History of onset of illness between 3 and 28 days of age AND History of inability to suck followed by stiffness and/or "convulsions" and often death

DISEASE	LAY DEFINITION (suspected)	STANDARD CASE DEFINITION (Probable diagnosis)
Tetanus	History of injury or ear infection followed by difficulty in opening of mouth (or jerking of mouth) or stiffness of the neck, body.	A person is likely to be suffering from tetanus when (s)he has : - a stiff jaw and trouble opening mouth or while swallowing ; - painful stiffness of the neck and abdominal muscles (often other body muscles also get stiff); - a clear mind ; - a wound, often infected or history of a wound within the past few weeks. In severe cases. the person may appear to be smiling (risus sardonicus) with raised eyebrows. The back and neck may be arched, arms may be bent with clenched fists and legs extended. Noise, light or slight touch may trigger sudden, painful tightening of the muscles (convulsions).
Tuberculosis	An ill child with history of contact with a suspect or confirmed case of pulmonary tuberculosis. Any ill child with one of the following : * who does not return to normal health after measles or whooping cough; and * with loss of weight, cough and wheeze who does not respond to antibiotic therapy for acute respiratory infection.	An ill child with history of contact with a suspect or confirmed case of pulmonary tuberculosis; and a child who does not return to normal health after measles or whooping cough; with loss of weight, cough and wheeze who does not respond to antibiotic therapy for acute respiratory infection OR with abdominal swelling with a hard painless mass and free fluid; with painful firm or soft swelling in any group of superficial lymph nodes; with any bone or joint lesion of slow onset; with signs suggesting meningitis or disease in the central nervous system.
Pertussis	History or observation of repeated and violent coughing, with any one of the following : cough persisting for two or more weeks, fits of coughing, cough followed by vomiting, typical **whoop** in older infants.	History of severe cough and history of any one of the following : cough persistent for two or more weeks, fits of coughing, cough followed by vomiting.

Confirmation by laboratory methods[1]

1. Measles	Positive serology. Four-fold or greater rise of measles antibody titres in serum.
2. Poliomyelitis	Positive virus culture from stool for polio virus. Positive serology (four-fold or greater rise in serum polio antibody titres)
3. Diphtheria	Positive culture of Corynebacterium diphtheria (demonstration of toxin production recommended, but not required in typical cases).
4. Tetanus and Neonatal tetanus	Nil
5. Childhood tuberculosis	Microscopic detection or culture of Tubercle bacilli from secretions
6. Pertussis	Positive culture or immunofluorescence of nasopharyngeal secretions for Bordetella pertussis bacteria

[1] **Laboratory methods or procedures of investigations are listed here for completion of the confirmation of diagnosis. It is not mandatory to do particularly when facilities are not available.**

B. OTHER DISEASES/EVENTS FOR SURVEILLANCE

DISEASE	LAY DEFINITION (suspected)	STANDARD CASE DEFINITION (Probable diagnosis)
Diarrhoea (including dysentery)	Child having watery and frequent stools is diarrhoea Stools containing either blood or mucus is dysentery.	Stools contain more water than normal. If stools contain blood or mucus, it is called dysentery. Frequent passing of normal stools, however, is not diarrhoea. Remember : babies breast-fed often have softer stools but may not suffer diarrhoea.

Pneumonia	A child having cough, cold, difficult breathing, fast breathing with or without chest indrawing	**Not severe pneumonia** when there is fast breathing and no chest in-drawing. Fast breathing when respiratory rate of 60 or more in a young child of age less than 2 months; 50 per minute or more, if baby is 2 to 12 months old; 40 per minute or more if 12 months to 5 years old; In addition to fast breathing, if chest in-drawing is present, there is **severe pneumonia**. All pneumonia in babies upto the age of 2 months are severe pneumonia. A child with cough or difficult breathing who has any of the **danger signs** such as : o not able to drink o central cyanosis o convulsions o abnormally sleepy or difficult to wake o stridor/wheezing in calm child o severe under-nutrition has got **very severe pneumonia.**
Anaemia in Pregnancy	Lack of strength, shortness of breath and pale nails, conjunctiva and inside of the mouth.	Reduction of red blood cell volume or haemoglobin concentration below the values occurring in healthy pregnant women i.e. 11gm/100ml Mild anaemia - 9-11 g/100ml Moderate anaemia - 5-9 g/100ml Severe anaemia - <5 gm/100ml

Maternal Death	Deaths in women during pregnancy or within 42 days of delivery	Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or the site of the pregnancy from any cause related to or aggravated by pregnancy or its management, but not from accidental (or incidental) causes Maternal deaths can further be broadly be grouped under three heads depending on when a pregnant woman dies : * before delivery - when death occurs before labour begins * during delivery - when death occurs during labour, child-birth or birth of placenta * within 6 weeks of delivery - when death occurs within 42 days of delivery or termination of pregnancy.

Confirmation by laboratory methods

1. Diarrhoea/dysentery	Demonstration of faecal leucocytes and/or RBCs, Amoeba or Giardia; Culture of stool showing pathogenic bacteria or virus
2. Pneumonia	Chest X-ray showing Pneumonia Lung needle aspiration culture showing causative organism (not done routinely)
3. Anaemia	Haemoglobin estimation Peripheral smear - for type of anaemia

1.2.7 Causes of maternal deaths

A. Direct obstetric deaths

Those resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium) from interventions, omissions, incorrect treatment and from a chain of events resulting from any of the above. 75% of maternal deaths are due to direct obstetric causes.

B. Indirect obstetric deaths

Those resulting from previously existing disease or disease that developed during pregnancy and which was not due to pregnancy, but which was aggravated by physiological effects of pregnancy. 25% of maternal deaths are caused by indirect causes.

We will briefly describe here the direct obstetric deaths you will aim to prevent through the child survival and safe motherhood programme.

1. **Prolonged labour** - is said to occur when true labour (i.e. second stage of labour) has persisted for more than 24 hours. Prolonged labour may be due to malpresentations such as breech, brow, shoulder presentation (transverse lie) or prolapsed arm.

2. **Obstructed labour** - Failure of progress of labour in the presence of strong uterine/contractions.

   * Obstruction caused by malposition of fetus at onset of labour

   * Obstruction by bony pelvis - contracted pelvis, fetopelvic disproportion (CPD), unusually large fetus causing disproportion, hydrocephalic fetus causing disproportion, fetal abnormality causing disproportion such as conjoined twins, myelomeningocele, tumour, etc.

   * Obstruction by deep transverse arrest, shoulder dystocia, locked twins.

3. **Toxaemia of pregnancy**

   * A condition characterized by high blood pressure, increased weight gain, swelling of legs and fingers with or without headache seen more commonly during first pregnancy after the 30th week (third trimester) - rarely occurs before the 24th week.

   * Toxaemia will be suspected by a health worker if there is increased blood pressure (>140 mm systolic) or if there is a weight gain of more than 5 kg in one month.

* **Eclampsia** is the severe form of toxaemia of pregnancy, and is characterized by convulsions and severe headache.

4. **Bleeding**

a) Antepartum haemorrhage (APH) is the bleeding per vagina after 28 weeks of pregnancy. Usually, it is due to placenta praevia and less commonly due to toxaemia of pregnancy.

b) Post partum haemorrhage (PPH) is the excessive bleeding (more than 500 ml. of blood against the normal of 200 ml.) from the genital tract which occurs during the third stage of labour or within 24 hours after the placenta has been expelled.

5. **Sepsis**

a) Puerperal sepsis

Infection of the genital tract within 14 days of child birth, characterized by :

* fever
* soft uterus not decreasing steadily in size
* foul smelling lochia or red lochia continuing even after 10 days
* lower abdominal pain and tenderness
* headache
* vomiting
* pallor or flushed face

b) Sepsis following abortion[2] (Septic abortion)

Infection of the genital tract following abortions, characterized by :

* fever
* lower abdominal pain and/or tenderness
* foul smelling discharge per vagina
* minimal vaginal bleeding
* history of attempt to terminate pregnancy

---

2 Abortion is termination of pregnancy (spontaneous or induced) when the gestational age of the foetus is less than 28 weeks.

EXERCISE B

In this exercise, you will compare your surveillance activities with those described in this module. The purpose is to see if there are ways you could improve your surveillance system.

1. Answer the following questions about your surveillance activities

   * Is your health facility part of a routine reporting system? YES/NO

   * Is your health facility part of a sentinel reporting system? YES/NO

   * Are you responsible for conducting case investigations? YES/NO

   If yes, for which diseases and under what circumstances?

   _____

   _____

   * Are you responsible for conducting outbreak investigation? YES/NO

   If yes, for which diseases and under what circumstances?

   _____

   _____

2. Which of the target diseases do you report?

   _____

   _____

   _____

   _____

   Do you use the standard case definitions, or list of symptoms for each of the six diseases? YES/NO

3. List five sources of data on diseases you use? Are they complete and accurate?

Source	Complete	Accurate
1._____	YES/NO	YES/NO
2._____	YES/NO	YES/NO
3._____	YES/NO	YES/NO
4._____	YES/NO	YES/NO
5._____	YES/NO	YES/NO

Do you receive reports of maternal deaths? YES/NO

Do you "double count" cases that visit twice for the same episode of illness or that are referred to a hospital? YES/NO

Do you count cases that:

* were not diagnosed by a health worker? YES/NO
* come to the health centre for treatment? YES/NO
* are treated at non-government health facilities? YES/NO
* are seen at outreach sessions? YES/NO

Can you think of any way to improve the sources of data so that the information you collect will be more complete and accurate and will provide information on as many cases as possible?

_____
_____
_____
_____
_____

4. Look at a copy of the surveillance report you use to regularly report cases of disease. Then answer these questions about your form:

   * Is it important to know the sex-wise incidence of diseases and death in the programme? YES/NO
     Why ?_____
     _____
     _____

   * Is neonatal tetanus reported separately? YES/NO

   * Is death due to tetanus in the postpartum period included under maternal deaths? YES/NO

5. Answer these questions about submitting monthly surveillance reports:

   * Do you submit reports even if no cases reported? YES/NO

   * What are the obstacles, if any, that prevent you from submitting reports on a regular and timely basis? How could these obstacles be overcome?

_____
_____
_____
_____
_____

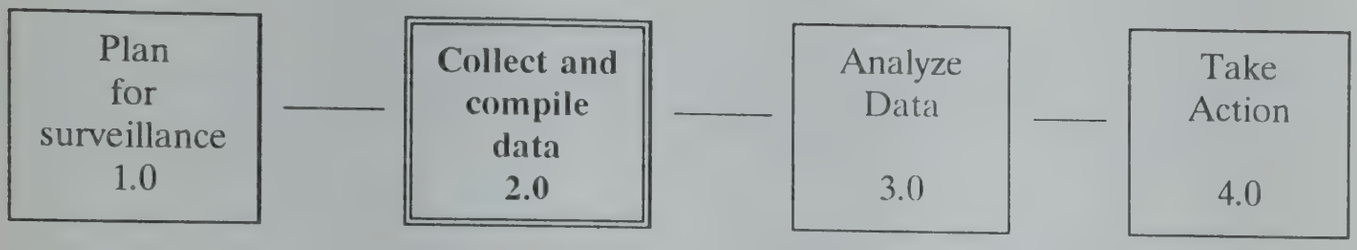
6. Are all your staff well trained in surveillance activities? YES/NO

   * Do they understand why surveillance is important? YES/NO
   * Do they know how to use the patient register? YES/NO
   * Can they diagnose diseases, using standard case definitions? YES/NO
   * In what other areas could you strengthen the skills of your staff?

_____
_____
_____
_____
_____
_____

See the facilitator when you are ready to discuss your answers

2.0 COLLECT AND COMPILE DATA



When collecting surveillance data it is important to :

* meet deadlines for reporting
* ensure all cases of disease which are seen are actually reported (**completeness**)
* submit reports even when no cases are seen (**zero reporting**)
* provide prompt **feedback**.

Health centre and district health officers collect and compile data in a similar way. For example, both tally cases, total them at the end of the month and prepare disease charts. The difference is that health centre medical officers collect information about cases that occur in their health area. A district health officer collects information about cases that occur in all health centres in the district.

District health officers are also responsible for making sure that surveillance information collected at the health centre is **reliable, accurate, complete and submitted on time.** If not, the district health officer will discuss with the health centre staff to identify why there are certain specific problems in reporting and how they can be rectified.

2.1 ROUTINE REPORTING SYSTEM

2.1.1 Tally cases on a daily basis and total them every month

To "tally" cases of disease, place a mark on the appropriate column in the tally form (Fig.4) for every case that is diagnosed or reported. Each tally mark '/' represents one case of the disease. After four tally marks cross it to make a block of five cases. In a health centre, cases should be tallied every day, while in a district office, it is done at the end of every month (when all the health centres have submitted their surveillance reports).

- Look at Fig. 4 for an illustration of tally marks, showing, for example, that two cases of polio, eleven cases of measles, and one case of neonatal tetanus were diagnosed and tallied on the report.

- On the last day of each reporting period, health centre medical officer should total the number of cases of each disease tallied during that reporting period. Record the total in the Monthly report.

- To this number will have to be added the number of cases and deaths reported by the health workers on the basis of information collected by them through the community based surveillance strategy described earlier. Care should however be taken to avoid duplication of entries by cross-checking the names and addresses of patients reported by the health centre and by the health workers.

- District health officers should also total the number of cases of disease in the district, after they have received the health centre reports.

Disease		Number Reported (as on 31.12.91)			
		For the Month		Cumulative since April	
		Cases	Deaths	Cases	Deaths
Diphtheria					
Pertussis		///		14	
Neonatal Tetanus		/		5	
Tetanus (others)		///		9	
Poliomyelitis (Acute)		//		6	
Measles		~~////~~ ~~////~~ /		190	
Under 5 years	Tuberculosis				
	Pneumonia				
	Acute Diarrhoea				
	Dysentery				
Maternal Deaths (Reported) : Before delivery : During delivery : Within 6 weeks of delivery				[redacted]	

Figure 4 : Tallymarking of monthly surveillance report

2.1.2 Investigate all cases of neonatal tetanus

As a Medical Officer you should use a case investigation form to investigate all cases of neonatal deaths. The purpose of investigating neonatal deaths is to identify why the case occurred so that future cases can be prevented.

For investigating a neonatal death, use case investigation form.
The case investigation form has questions on:

* The immunization status of the mother.

* Whether the mother received antenatal care.

* The venue of birth of the baby.

* Whether a trained attendant was present during delivery.

* How the cord was cut and treated.

* Whether the infant sucked normally at birth, then later developed problems with sucking, convulsions and stiffness.

* Whether the infant was treated in a hospital for the illness.

* When was the child initiated on breast milk.

District health officers should monitor and ensure that neonatal deaths are investigated promptly and correctly and help with the investigations himself or provide additional training if health workers are uncertain of the procedures to follow.

2.1.3 Investigate all cases of poliomyelitis

You **have** the responsibility for investigating polio cases. Do the following immediately :

1. collect information using a case investigation form.

2. establish a provisional diagnosis.

3. collect and send laboratory specimen according to programme specifications.

4. enter data on the line list of lame children (see Annexure I a)

National Child Survival & Safe Motherhood Programme

Investigation of Neonatal Deaths

To be completed by the Medical Officer on all infants who died within the 1st month of life (a separate form for each neonatal death).

I. General Information

1. State/U.T _____
2. District _____
3. Town (Mohalla)/PHC (Villaage)/Ward _____
4. Physician's name _____
5. Date of investigation _____

II. Background Information on Neonatal Death

1. Name of Child _____
2. Sex _____
3. Father's Name _____
4. Address of child _____
5. Date of birth of child _____
6. Person interviewed by the Investigator _____
7. Relationship of person interviewed to child _____
8. Date of death of child _____

III. Mother's Immunization History

1. Does the mother know about vaccination with TT? YES NO
2. No of doses received during this pregnancy? [0] [1] [2] [3]
3. Date of last dose of TT _____
4. Card entry verified YES NO

IV. Infants Care since Birth (please circle appropriate answer)

1. Where was the child delivered? Hospital/Health Centre/Home/In the Fields/Other (please specify) _____
2. Who delivered the child ? Doctor/LHV/ANM/Tr.TBA/Untr.Dai/Family members/Other (please specify) _____
3. How was the cord cut? Sterile /unsterile (unboiled) Instrument
4. How was the cord dressing done? (use code) + (a=oil, b=cowdung, c=gentian violet, d=antibiotic, e=none and f=other)
5. When the child became ill, who treated the child? (use code) ++ {a=govt. health centre, b=reg physician (allopathic/ayurvedic/homeopathic), c=unregistered physician and d=no treatment received}
6. When was the child initiated on breast-milk? within 2 hrs / 2-4 hrs / 4-8 hrs / 8-24 hrs / 24-48 hrs / > 48 hrs.

V. Symptoms preceding infant's death (please circle appropriate answer)

1. Was the infant able to suck the milk after birth? YES NO
2. Did the infant stop sucking milk when illness began? YES NO
3. Did the infant have a fever? YES NO
4. Did the infant have convulsions? YES NO
5. Was the infant noted to be stiff? YES NO

VI. Other Information on Mother

1. Is the mother alive? YES NO
2. If dead, date of death _____
3. Symptoms preceding death _____

VII. Medical Officer's Diagnosis

1. Cause of Neonatal Death _____
2. Cause of Mother's Death _____

Date of Reporting: _____ Investigator's Name: _____

5. arrange for follow-up of case.

6. initiate community control activities after discussion with district officials.

7. include the case of polio in your regular monthly surveillance report.

8. report all activities to district and state officials.

2.1.4 Investigate all maternal deaths

In your monthly report, under the section A on surveillance, you are collecting information on maternal deaths occurring in your area. A majority of these deaths may be taking place at homes and in villages and some in the PHCs or other institutions. Whenever you learn about a maternal death in your area you should ensure that the death is investigated and the circumstances leading to the death are determined. The form shown under Annexure Ic should be filled by the health supervisor and checked by you or the medical officer of the PHC for deaths occurring in your area. In addition, the sentinel surveillance centres will fill in every month the report on maternal deaths (Annexure Vc) as well as analyze the deaths taking place every year on the form Annexure VIc. As a manager of the child survival and safe motherhood programme, you will try and determine the causes of maternal mortality and also determine whether they are occurring before, during or after child-birth or abortion.

2.1.5 Prepare a disease map

In the health centre, a disease map can be used to monitor the geographic locations of cases of disease. It can help you learn whether cases are clustered in one particular area or whether they are widespread. For example, by looking at the map in Figure 5, you will notice that there are a large number of measles cases in village G.

Use the map to monitor locations of cases of all diseases or of only some of them such as measles, neonatal tetanus and poliomyelitis. In order to monitor the locations of cases of diseases, follow the steps below. Every day, after you diagnose and tally a case of disease:

1. Place a pin or draw a dot on the map to indicate the village where the case of a particular disease occurred.

2. If you are monitoring locations of cases of more than one disease, use coloured pins or dots, with each colour representing a different disease. If the number of cases of a disease reported in your area is usually very large, you may use a pin or dot to represent more than one case for example for every five or ten cases. Remember not to place the pin for fractions or less than five in that case.

   If a case diagnosed and treated at the PHC belongs to a village outside its geographic jurisdiction do not place a pin for that case. Notify the PHC or district from where the particular patient was treated in your PHC.

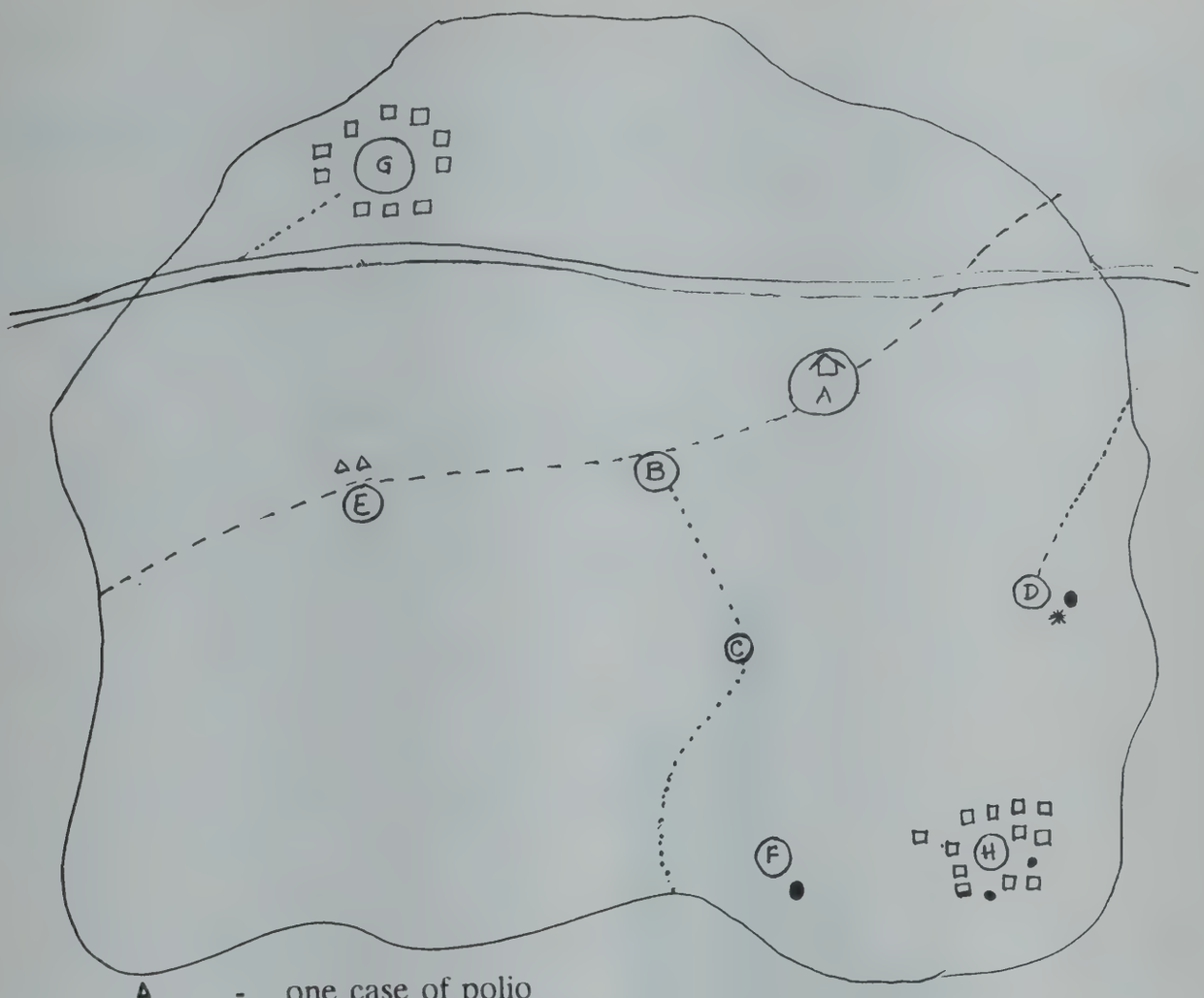
3. At the end of each reporting period, record in a notebook the number of cases that occurred at each village during the previous reporting period.

4. After you have recorded the number of cases of the target diseases in each village, remove all the pins or dots from the map.

   By just one look at the map you will be able to tell exactly where the target diseases are occurring and how serious the situation is in each village, e.g. if the map shows 11 cases of measles were reported in each of the 2 villages, one with a population of 5,000 and the other with a population of 800, you could easily interpret that the smaller village has a serious problem compared to the larger village.

District health officers

- can map or plot cases by health centre or health facility and;
- monitor that health centres are preparing and using disease maps.



△ - one case of polio
□ - one case of measles
* - one case of neonatal tetanus
● - maternal deaths

---- - Major Highway

---- All weather road

... Foot Path

o Village

Health Centre

Population data

Village A 5,000
Village B 2,500
Village C 600
Village D 600
Village E 700
Village F 500
Village G 800
Village H 5,000

_____ 5 Km.

Total Population **15,700**

Figure 5 : Mapping of cases in a health centre area

2.1.6 Prepare disease charts or graphs

Disease charts and graphs are used to present surveillance data in a way that makes the data easier to comprehend. They allow you to compare the number of cases occurring in each reporting period to the number that have occurred in the past.

Plot cases of polio and neonatal tetanus, measles, diarrhoea on a disease chart (see Figure 6) or a disease graph (see Figure 7).

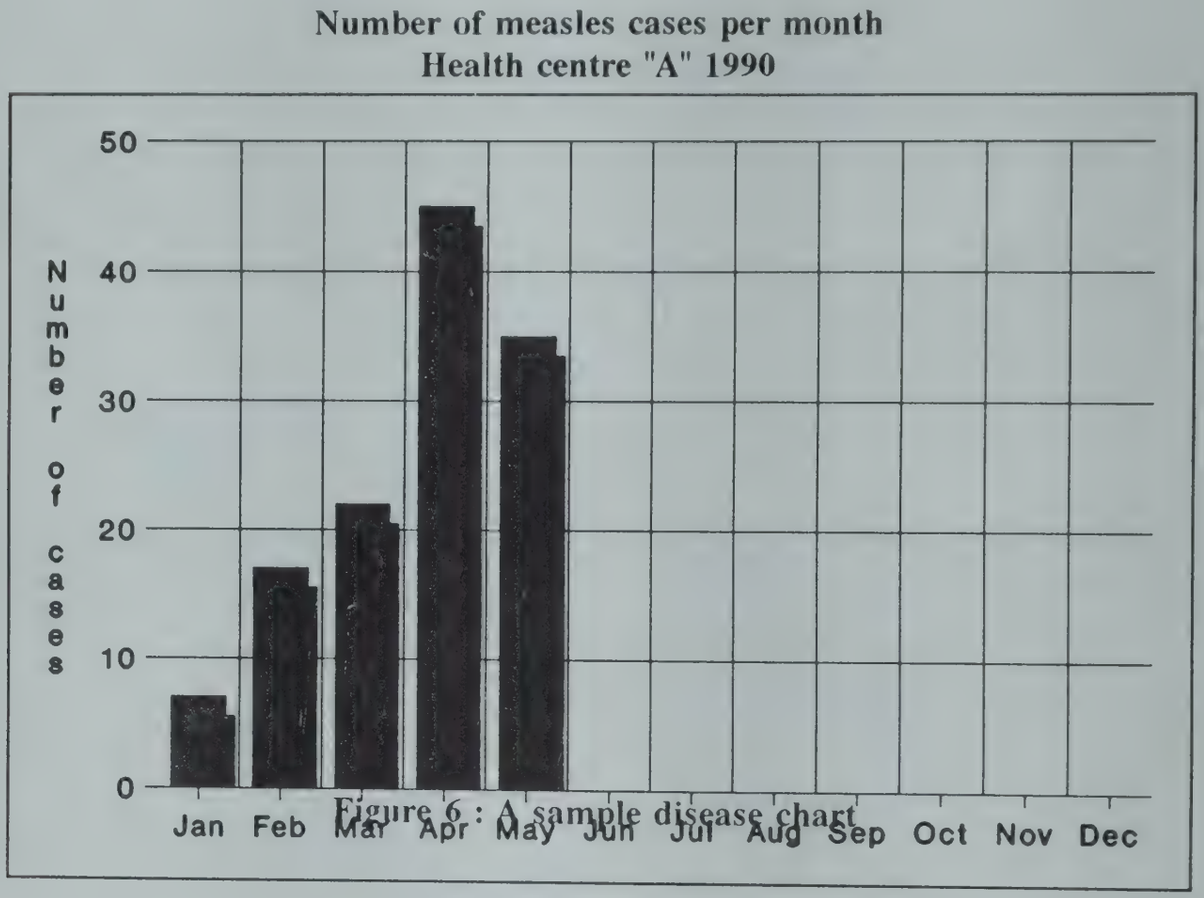


Figure 6 : A sample disease chart

To prepare a disease bar chart, perform the following steps:

1. Draw a blank chart, using the one in Figure 6 as a model. Note that the vertical lines should be placed on either side of the name of months. On the left axis, called "Number of cases", draw a line for each case or for a group of cases (for example, for every 5 cases).

2. Write a title on the chart, making sure to identify the disease that is the subject of the chart, the reporting period, the year and the health area.

3. In the space for the reporting period on the chart, draw a bar representing the number of cases diagnosed. Then shade in the boxes that represent all cases that were reported.

Most health centres make disease charts for a 12-month period. The sample disease bar chart below shows the number of measles cases reported per month at Health centre A in 1990. The chart is filled in for January through May. Note that 7 cases of measles were reported in January and 45 cases were reported in April.

Disease charts or graphs that show disease trends over a period of several years (See Fig.7).

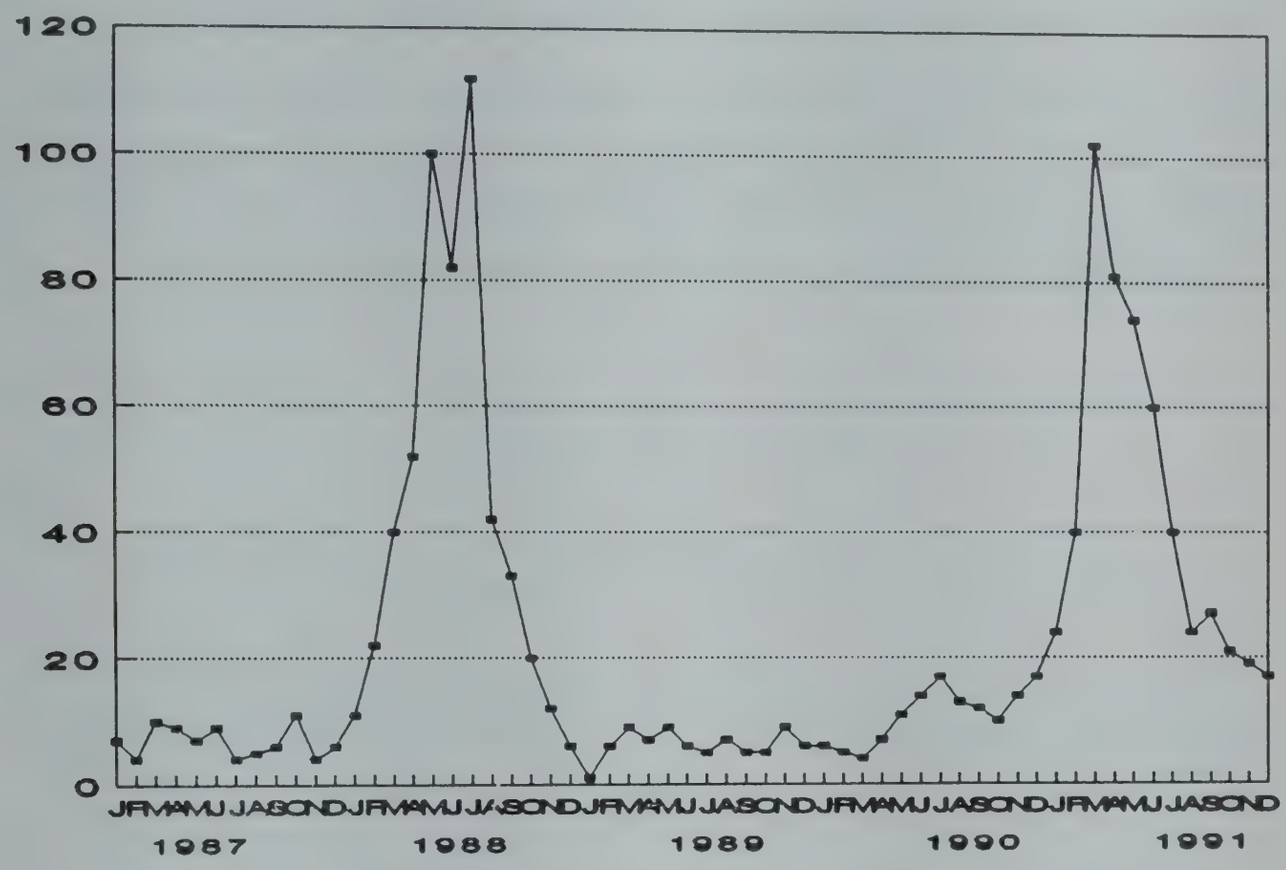


Figure 7 : Disease trends over five years plotted on a graph

* When a district health officer distributes copies of the district charts to health centre medical officers, they can compare disease trends in their area to disease trends in the district.

* You will also be able to use deaths and provide valuable feedback to your health workers and show them that you care about their work.

2.1.6 District health officers receive surveillance reports

Regularity

District health officers should keep a chart as shown in Fig. 8 on the wall to record dates of submission of monthly reports by the health centres. By maintaining this chart, you can quickly review which health centres and hospitals are reporting promptly.

Reports should be submitted to the district within the first week of every month.

Remember : If reports are late or missing or they are incomplete or late contact the health centre. Determine the reasons for incomplete or delayed reporting and discuss how you can help the health centre medical officers improve reporting.

DATES SURVEILLANCE REPORTS RECEIVED

District : BASTAR Year : 1991

REPORTING UNITS	Date of receipt of the monthly report of											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Health centre A	5/2	6/3	4/4	3/5			3/8	6/9	4/10	6/11	5/12	4/1
Health centre B		13/3			6/6	5/7		10/9			13/12	
Health centre C		9/3	4/4	8/5	7/6				8/10	9/11	5/12	4/1
Health centre D	14/2	8/3		15/5	8/6	9/7		14/9		13/11		8/1
Health centre E	6/2	6/3	11/4	10/5	5/6	6/7	7/8	10/9	15/10	9/11	6/12	7/1
Health centre F			9/5	9/5		20/9	20/9	20/9		27/12	27/12	
Hospital A	9/2	7/3	16/4	8/5	14/6	9/7	6/8	11/9	12/10	13/11	12/12	7/1

Figure 8. Receipt of monthly surveillance reports

EXERCISE C

In this exercise you will total the number of cases on a monthly surveillance report and plot on a disease chart the cases of measles that were reported over a period of one year. In a later exercise you will analyze this information. Follow the steps below:

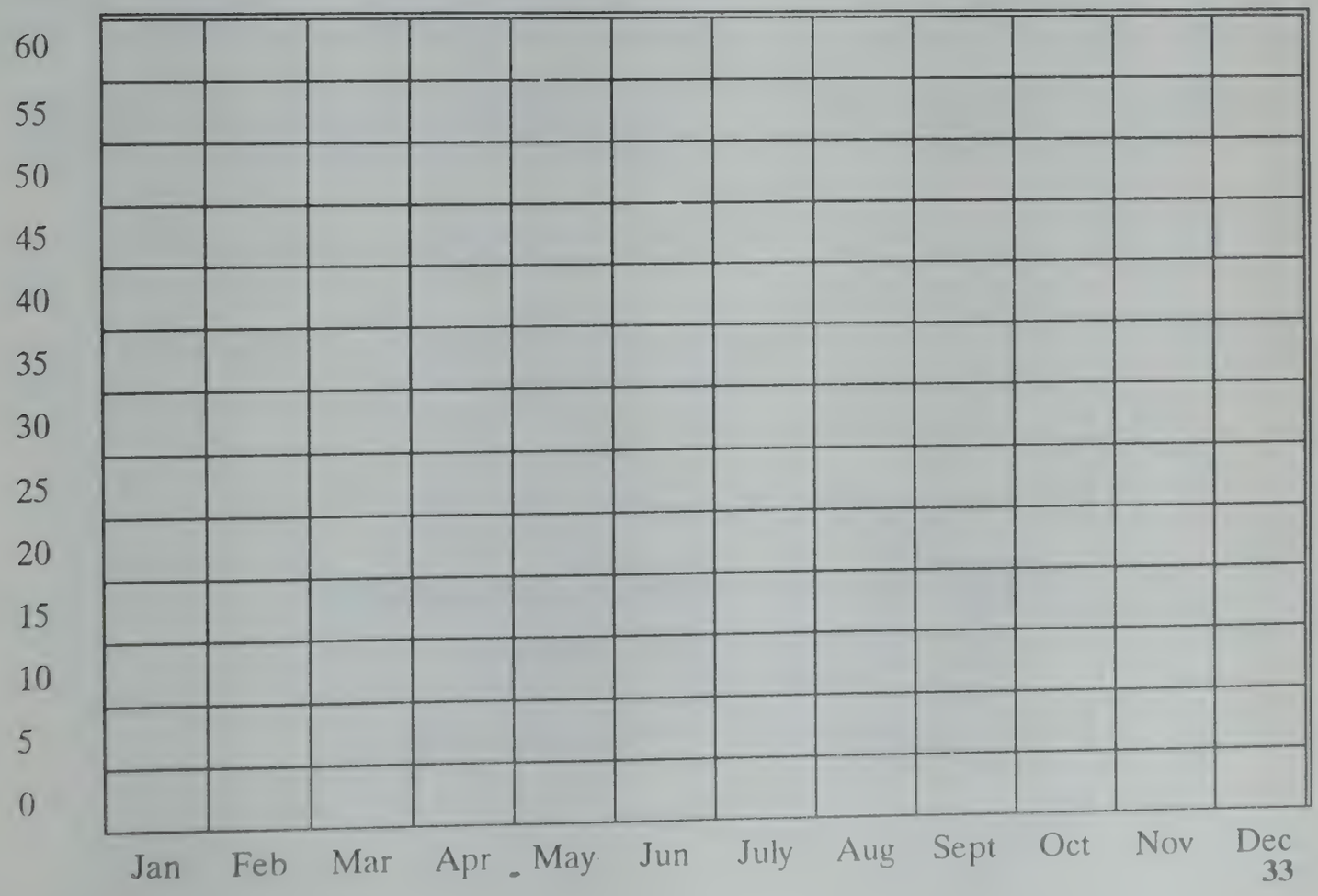
1. On page 24 is a Monthly surveillance report for a health centre that has cases of disease tallied on it for the month of December 1991.

2. The health centre supervisor of the health centre did not plot cases of measles on a bar chart, so you will do it for him. Use the data from the Monthly report on page 24, plus the following information about the number of cases in each month of the year, to make the bar chart. Use the workspace given below to draw the chart.

The number of cases of measles for the first eleven months of the year are as follows:

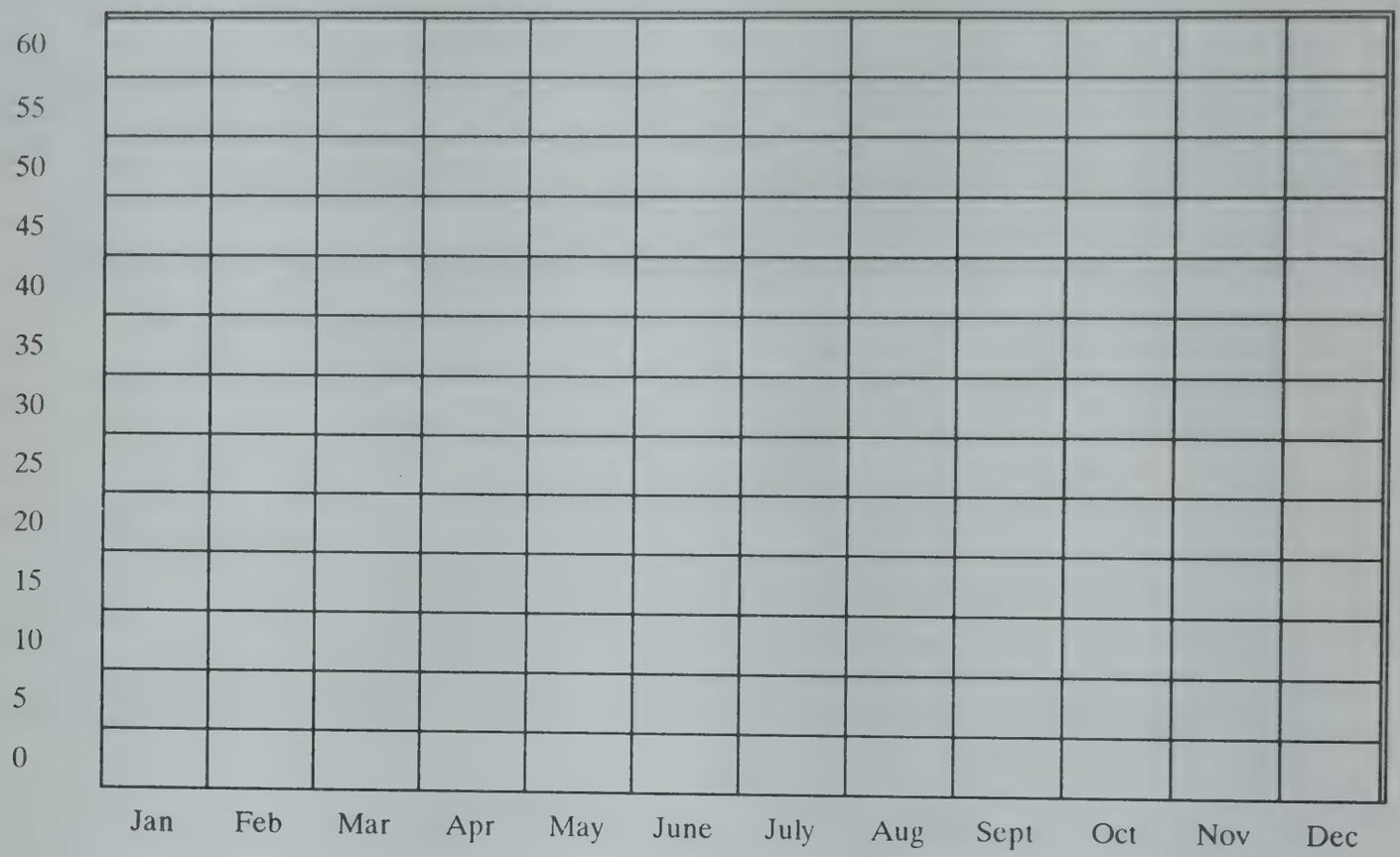
January	25	July	9
February	32	August	10
March	28	September	9
April	17	October	12
May	12	November	14
June	11	December	(Refer to Figure 4 on page 24)

Health centre:_____ Year : _____



If you have brought information on the number of cases of disease in your area, draw chart for one of the diseases here :

Health centre:_____ Year : _____



See the facilitator when you are ready to discuss your answers

2.2 SENTINEL REPORTS

In most respects, sentinel sites are similar to routine reporting sites. Both collect information about cases, investigate cases of selected diseases and deaths and prepare disease maps and charts/graphs.

However, sentinel sites collect and report more information about each case. They include the immunization status, age and sex of each case, in addition to the total number of cases of each disease. Therefore, sentinel sites use a different reporting form.

2.2.1 Sentinel surveillance for vaccine preventable diseases

Figure 9 is a Monthly Surveillance Report format used by sentinel surveillance sites. To complete the Monthly sentinel surveillance report, follow the following steps:

1. Identify the age and sex of the case and the corresponding column on the form. The age categories are: "less than 6 months of age", 6-11 months, 12-23 months, 2-5 years of age", and more than 5 years of age".

2. Determine the immunization status of the case:

"**Not immunized**" means that the case had not received any dose of the immunization that should have given protection from the disease.

"**Immunized**" means 1 dose each of Measles and BCG vaccine and 3 doses each of DPT and OPV vaccines received with the last dose given at least 15 days before the onset of disease.

"**Not known**" means that the immunization card is not available and that the child's mother or guardian cannot remember whether the child was immunized for the disease or not.

NOTE: When determining the immunization status of a case of neonatal death (a) you must consider the mother's immunization status, and

(b) indicate as a footnote whether the child was immunized too soon of much later when compared with the recommended age for that dose.

3. Tally every case in the appropriate column on the form.

4. At the end of each month, total the number of cases in the "Total cases" column.

SENTINEL SURVEILLANCE REPORT - VACCINE PREVENTABLE DISEASES

Sentinel Centre _____
District _____
State _____
Month _____ Year _____
Disease** _____

Description	Cases			Deaths			Immunization status		
	M	F	Total	M	F	Total	Immunized	Not immunized	Unknown
less than 6 months									
6 - 11 months									
12 - 23 months (<2 years)									
2-5 years									
> 5 years									
Total									

Figure 9 : Monthly sentinel surveillance report - vaccine preventable diseases

* Immunized children should have received :
1 dose of Measles and BCG and 3 doses of DPT and OPV vaccines (last dose received at least 15 days before the onset of the disease).

Note: Do not include a case of poliomyelitis, if history of onset is 3 months or more. All cases of brochopneumonia or severe diarrhoea who give a history of measles or pertussis one month prior to illness should be included under measles or pertussis.

** Use this format for each one of the six vaccine preventable diseases - Diphtheria, pertussis, tetanus, poliomyelitis, measles and tuberculosis; one form each for one vaccine preventable disease.

2.2.2 Sentinel surveillance for diarrhoea and pneumonia

Figure 10 is a monthly surveillance report format for use by sentinel surveillance site for reporting cases and deaths of diarrhoea and pneumonia. While the information on diarrhoea is collected by age groups similar to that followed for vaccine preventable diseases the age groups for pneumonia is i) <2 months, ii) 2 to 12 months, iii) 1 to 5 years and iv) >5 years.

Sentinel Centre _____
District _____
State _____
Month _____ Year _____
Disease** Diarrhoea

Description	Cases			Deaths			Vitamin A Prophylaxis			Measles Immunization	
	M	F	Total	M	F	Total	Full	Partial	Not given	Given	Not given
less than 6 months											
6 - 11 m											
12 - 23 m											
2-5 yrs.											
> 5 yrs.											
Total											

Disease** Pneumonia

Description	Cases			Deaths			Vitamin A Prophylaxis			Measles immunization	
	M	F	Total	M	F	Total	Full	Partial	Not given	Given	Not given
< 2 months											
2 - 12 m											
1-5 yrs.											
> 5 yrs.											
Total											

Figure 10 : Monthly sentinel surveillance report - diarrhoea and pneumonia

Date :

Signature

In addition to including information on the age and sex of children with diarrhoea and pneumonia, you will also determine the measles immunization status and whether the child has received the appropriate number of vitamin A megadoses for that age as per schedule of the child survival and safe motherhood programme.

2.2.3 Sentinel surveillance for maternal mortality

Every health centre will report maternal deaths as part of the monthly reports. In addition, line listing will be done for of all maternal deaths occurring in a PHC area and the district as discussed under 2.1.4.

In addition, the sentinel surveillance centres will prepare an analytical report once a year in April on all maternal deaths by the six complications that have taken place during one year as shown below:

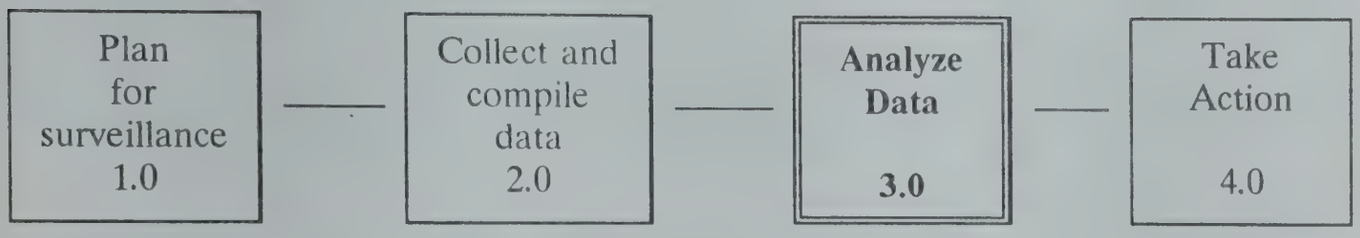
ANALYSIS OF ANNUAL DATA FROM SENTINEL SURVEILLANCE -
Maternal Deaths

1. Sentinel Centre :
2. District :
3. State :
4. Year of Reporting :
5. Total no. of deliveries in the year :
6. Total no. of maternal deaths :

Sl.No.	Maternal deaths	Causes	Number	Total
1.	Tetanus	Unimmunized mothers		
		Immunized		
2.	Bleeding	Antepartum		
		Post-partum		
3.	Sepsis	Post Abortion		
		Post delivery		
4.	Obstructed Labour	Rupture Uterus		
		Not ruptured		
5.	Toxaemia of Pregnancy	With convulsions		
		Without convulsions		
6.	Anaemia associated	Severe <5 gm/100 ml		
		Moderate 5-9 gms/100ml of Hb		

Date :

3.0 ANALYZE DATA



When analyzing surveillance data, it is important to look for:

* trends in disease occurrence
* clustering of cases in certain areas/periods of time and
* changes in age groups

Different methods of data collection give various types of information. The following information can be obtained by analyzing routine and sentinel surveillance data:

ROUTINE REPORTING Trends of diseases and deaths by time and area

SENTINEL REPORTING Trends of diseases and deaths by time in selected areas (to serve as advance warning and indicators of the effectiveness of services)

- Age distribution of cases
- Sex distribution of cases
- Immunization status of cases

3.1 ANALYZE DATA FROM ROUTINE REPORTING SITES

There are two key steps in analyzing data from routine reporting sites:

First, identify disease trends by looking at the total number of cases and deaths that occurred and compare with the number reported in previous months and previous years. Are the numbers higher, lower or about the same? What are the most probable reasons for it?

Next, review the following forms :

I Line lists for (i) neonatal deaths, (ii) acute poliomyelitis i.e. list of lame children and (iii) maternal deaths ;

II Case investigation forms for (i) neonatal deaths, (ii) acute poliomyelitis and (3) diarrhoea/cholera deaths (during epidemics)

3.1.1 Identify disease trends and their causes

The term "disease trend" refers to whether or not there are changes in the number of reported cases of disease over time. Unexpected increases can be a sign of failure. Decreases can signal either success or reporting failure. Seasonal trends in vaccine preventable diseases suggest that there is a problem with immunization coverage and/or vaccine quality.

In routine and sentinel reporting systems, there are five major factors which influence the number of reported cases of a disease:

* Completeness and regularity of reporting

* Seasonal variation

* Epidemic pattern

* Immunization coverage

* Age at immunization

These factors are described in detail in the following pages.

Completeness of reporting

Changes in the number of reported cases can be caused by real changes in the incidence of disease or by changes in the way that cases are reported. Two major reasons for changes in reporting are:

1 a. Changes in the women's awareness and willingness to make use of the ante-natal, intra-natal and post-natal care offered by the health centre;

b. Changes in parents' attitudes in the use of the health centre when they have a child with a reportable disease and

c. Number of units reporting cases can either increase or decrease. This is closely linked to timeliness. In a district if only certain health centres report in time, the district report will be incomplete.

2 Changes in the skill and interest of health workers in diagnosing, recording and reporting the cases they see.

For example, when you take steps to increase the utilization of health services by the community, more patients may be encouraged to come to the health centre and you may at the same time increase the interest and skills of your health workers. Therefore an increase in the number of reported cases may be a sign of improvement in the services, rather than a sign of increased disease in the community!

However, if neither of the above conditions have changed since the previous reporting period, you can be more confident that comparing the reported cases with those of past periods will tell you the actual trends in the diseases.

Seasonal variation

Some diseases occur in seasonal patterns. This means that there is a season in which more cases occur than at other times of the year. The seasonal variation for some diseases (for example, pertussis, polio, measles) are more noticeable than those for other diseases (such as tuberculosis, tetanus). When immunization coverage increases, the seasonal variation is less obvious.

The season in which most cases of any disease occur is different in different geographic areas. Also, not all diseases peak during the same season. Therefore, you must use your disease charts to learn when the seasonal peaks of each disease occur in your area.

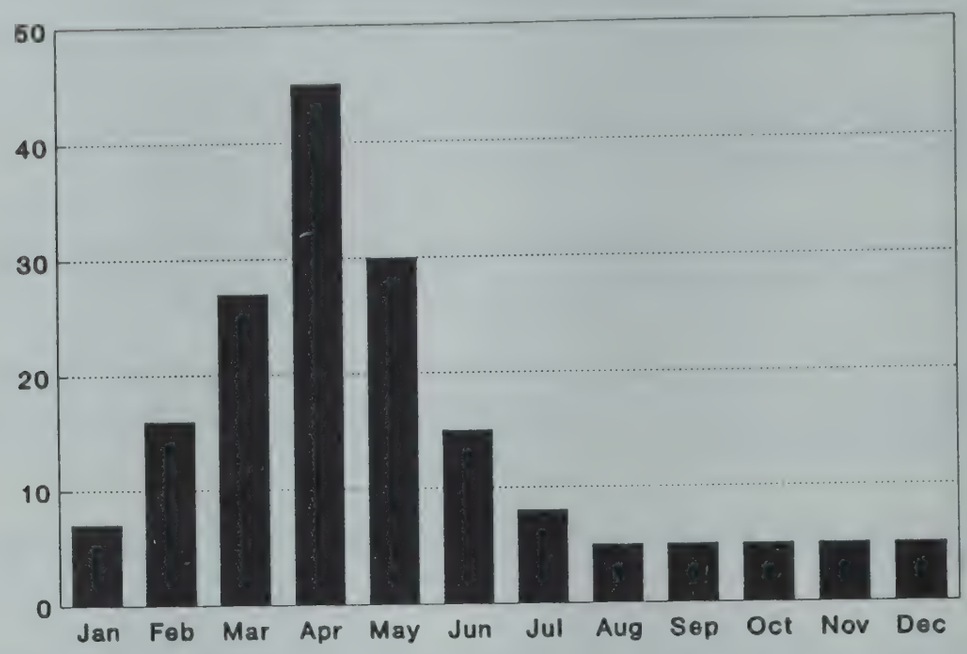


Figure 11 : Seasonal variation of measles

Figure 11 on above shows the seasonal variation of measles. Notice the increased number of cases in February, March, April and May.

When analyzing surveillance data, think about how seasonal variations may explain the increased or decreased number of cases. Ask: Is the increased or decreased number of cases likely due to seasonal variation?

Epidemic pattern

An "epidemic" is defined as the occurrence in a community or region of illnesses similar in nature clearly in excess of the usual incidence.

Some diseases naturally occur in epidemic and non-epidemic years. That is, an epidemic year will occur, followed by 1, 2, 3, or more years with relatively few cases of the disease, followed by another epidemic year. When immunization coverage increases, the epidemic pattern change and the time interval between epidemics increase.

When disease incidence reach low levels due to effective immunization activities, no clear epidemic pattern may exist. Even one case may justify careful investigation and possible control measures. This is especially true for polio, when, after a break of several years, a case may be introduced, necessitating immediate action.

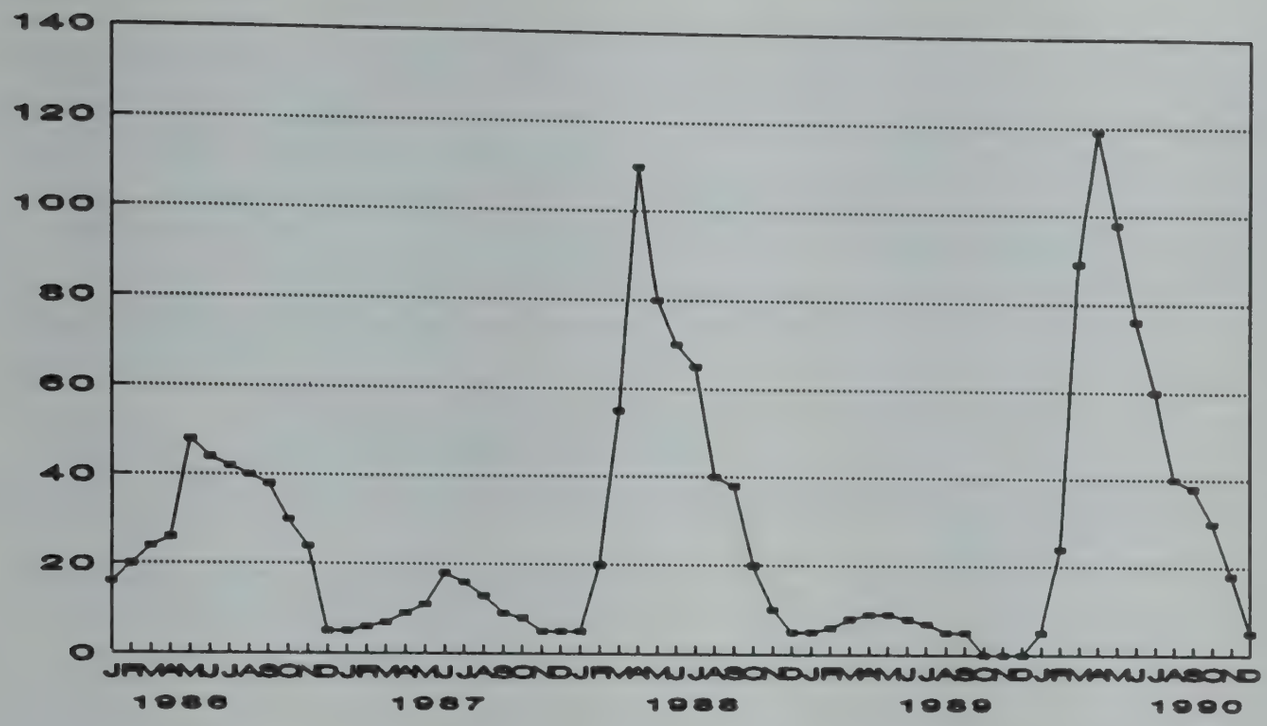


Figure 12 : Epidemic pattern and seasonal variation

The epidemic pattern varies among different areas and every disease manifests a different pattern. Epidemics of some diseases are more frequent than others. You must therefore, use disease charts and graphs to learn about epidemic patterns of diseases in your area. Figure 12 above shows the epidemic pattern and the seasonal variation of measles. Note the difference between the two types of disease trends.

When analyzing surveillance data, consider the influence of epidemic patterns by asking: How does this year's pattern compare with previous years? Can the increase (or decrease) be explained by the epidemic pattern?

NOTE: An unchanged epidemic pattern for vaccine preventable diseases, especially measles and pertussis, means that the immunization activities need improvement.

Immunization coverage

The purpose of immunization is to reduce the number of cases of vaccine preventable diseases. Therefore, if immunization coverage increases and vaccines of high quality are used, number of cases will decrease. Similarly, if coverage decreases, you can expect more cases of the disease. An example is found in the history of tetanus in District D as shown in Figure 13 in page 44. Note how quickly the number of cases decreased as immunization coverage increased.

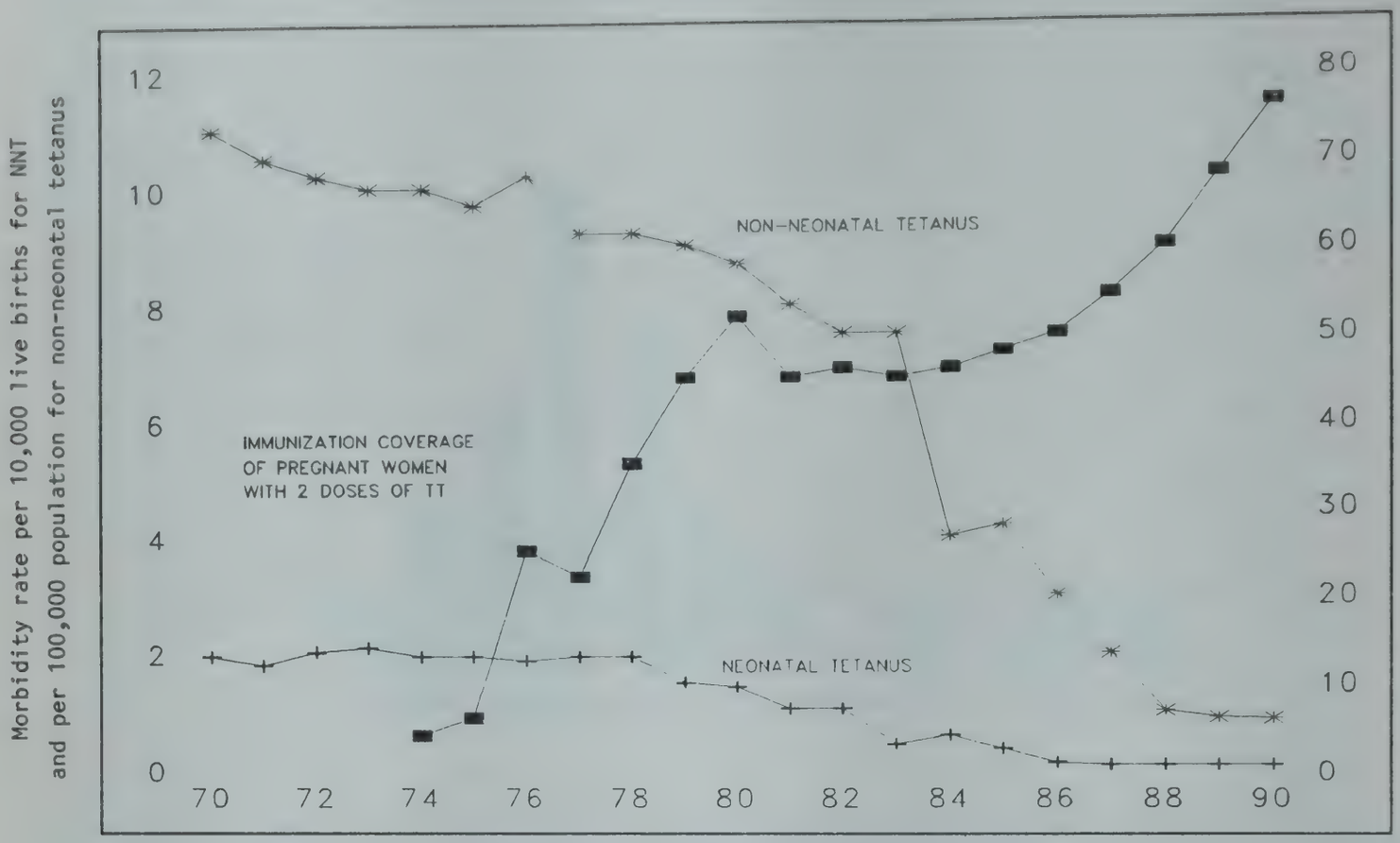


Figure 13 : Tetanus in District D

If all children in the target population are immunized with a vaccine of good quality, there will be very few cases of disease. Yet, even with 100% coverage, you will see some cases of disease. This is because no vaccine is 100% effective, and because unimmunized people may move from other areas into your area.

However, **any case in an immunized child must be investigated thoroughly.** First confirm the diagnosis in such cases and confirm the history of immunization at least 2 weeks prior to the illness. If more than 10% of all cases were in children who were immunized then the vaccine used was not potent. This is an emergency for your programme.

Age at immunization

Vaccines must be given at the right age in order to be effective. All efforts must be made to complete the full course of immunization as early as possible but definitely before the first birthday. Measles vaccine is not administered before 9 months of age. It is important to administer vaccines before the child has been exposed to the risk of infection i.e. every child should be immunized against measles before it attains the age of one year. If vaccines are used up for children who are already immune through natural infection, it is a waste. Such an effort will not reduce the load of susceptibles within a community.

* The decrease in non-neonatal tetanus is not due to increased coverage of pregnant women only. It is due to simultaneous increased coverage of other populations in the same

Timeliness

The national immunization schedule indicates the ideal time schedule for every antigen. It is advocated that all children need to be fully immunized by age one. It is important to immunize a child with any dose of vaccine / antigen as soon as the child becomes eligible for the same. Among the important reasons for less than expected impact is delay in timely immunization. Therefore, to get maximum epidemiological impact of reduction of various vaccine preventable diseases **timely immunization** by age is absolutely essential. You will, while analyzing the surveillance reports, have to specifically ask your health workers whether this is being done.

When analyzing surveillance data, check the immunization reports and ask: Are immunization reports correct and are the calculated coverage levels accurate?

* If coverage is going up, is the number of reported cases going down?

* If coverage is going down, is the number of reported cases going up?

* Are immunized people getting the disease from which they should be protected?

EXERCISE D

This exercise is to understand the various ways in which reported data is interpreted. A wrong interpretation must be avoided. To avoid misinterpretation more details of the process of collection of data and the related factors are to be provided.

1. 5 hospitals in Koraput district reported deaths due to diarrhoea in the year 1991. The total number of deaths were 240. From the records of previous 4 years the number of deaths due to diarrhoea were 190 (1990), 165 (1989), 135 (1988) and 100 (1987) respectively. Now plot these figures on a graph paper and comment on the graph.

   Are the number of deaths due to diarrhoea increasing or decreasing in the district: (Please circle the correct answer)

   Increasing / Decreasing / Not sure, want more details

2. Rayagada hospital has sent without fail the reports on deaths due to diarrhoea to district headquarters at Koraput from 1987 onwards. The annual figures are 100, 110, 120, 130 and 140 for 1987, 1988, 1989, 1990 and 1991 respectively.

   Now plot these figures on a graph paper and answer the following question:

   Are the number of deaths due to diarrhoea increasing or decreasing in Rayagada area? (Please circle the correct answer)

   Increasing / Decreasing / Not sure, want more details

   Once you are ready please inform the course facilitator. Those who have ticked "Not sure, want more details" deserve to be congratulated. Others may ask "why?" Now read:

Misinterpretation of data

Several factors can influence the reporting of number of cases. You will have to carefully review the possible reasons for 'increase', 'decrease' or 'no change' in number of cases reported by your centre.

Analysis of your data should be thorough. Unless it is carefully analyzed, mere plotting a graph of the total number of cases reported may not provide the true picture. In 1991 there were 5 hospitals reporting in Koraput district: Rayagada (A), Gunupur (B), Koraput (C), Umarkot (D) and Kodinga (E). If only a summary of total cases is plotted, it appears that the number of deaths is increasing. Figure 14 on the facing page illustrates this point.

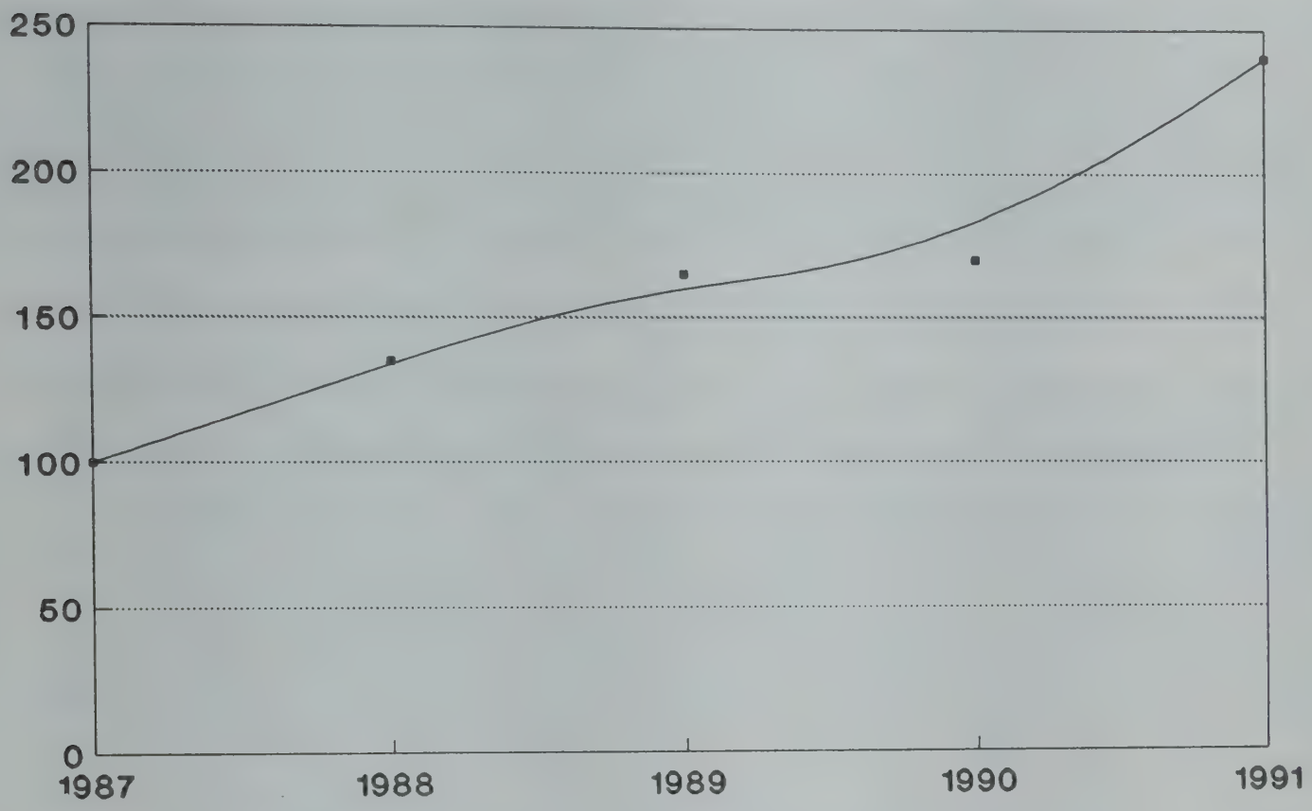


Figure 14 : Diarrhoeal deaths in Koraput district

Although earlier we felt that the diarrhoeal deaths in Koraput have been increasing every year, you will notice from the table below that the number of reporting units have also been increasing through the years. The increase thus is pronounced due to increase in number of reporting units.

Increased Reporting sites

Hospital	1987	1988	1989	1990	1991
Hospital A	100	110	120	130	140
Hospital B	--	25	30	25	30
Hospital C	--	--	15	20	20
Hospital D	--	--	--	15	20
Hospital E	--	--	--	--	30
Total Cases	**100**	**135**	**165**	**190**	**240**

Increasing completeness of reports

One method of overcoming incompleteness of reporting from multiple sites is to choose what is known as a sentinel site - an institution that consistently and completely reports all cases of the diseases under the programme. At first glance, hospital A in the previous example would seem to fit that criteria. But, once again, it is important to look beneath the surface of yearly compilation of reports. For example, it is possible that the hospital has not completely reported for every month of the year. The table below illustrates this point very well.

Months	1987	1988	1989	1990	1991
January	5	--	15	10	10
February	--	10	10	15	15
March	--	25	--	15	15
April	25	--	20	--	10
May	30	--	30	15	15
June	--	30	--	10	5
July	--	10	20	--	15
August	--	--	15	20	10
September	15	--	--	20	20
October	--	20	10	10	10
November	--	--	--	--	10
December	25	15	--	15	5
Total Deaths	**100**	**110**	**120**	**130**	**140**

Further, when we analyze the information given in the table above and calculate the average monthly diarrhoeal deaths in Hospital A, you will note that the death rate has been actually coming down. The table on the facing page illustrates the decrease which becomes obvious after analysis.

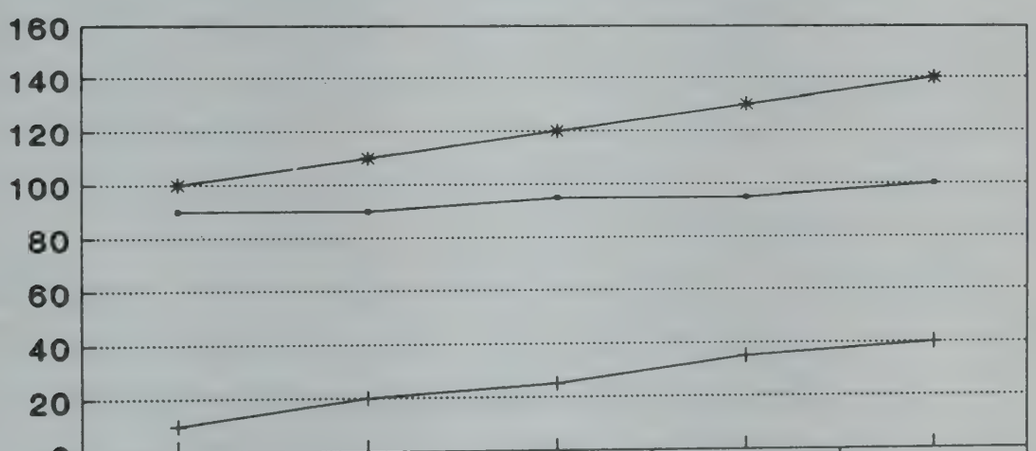
Average diarrhoeal deaths at Hospital A

Year reported	1987	1988	1989	1990	1991
Total Number of diarrhoea deaths	100	110	120	130	140
No. of months reporting done in the year	5	6	7	9	12
Average monthly deaths due to diarrhoea	20	18.3	17.1	14.4	11.7

Increasing number of non-residents

Now consider the situation of a sentinel hospital that consistently and completely reports all deaths due to diarrhoea. In an area with improved standards of living and transportation increasing number of persons residing outside the normal catchment area of the hospital have access to the referral hospital. The number of deaths due to diarrhoea may be higher due to the increasing number of non-residents. If the yearly summary of total cases is plotted, the graph will show an increase in number of deaths. However, when the deaths among residents and non-residents is analyzed and plotted separately the picture becomes clearer.

Number of diarrhoeal deaths in a sentinel hospital



	1987	1988	1989	1990	1991
Residents	90	90	95	95	100
Non-residents	10	20	25	35	40
Total cases	100	110	120	130	140

Residents Non-residents Total cases

Figure 15 : Deaths in a sentinel hospital amongst residents and non-residents

Population size in catchment area

Another reason for an apparent increase in the number of deaths can be the changing population size of the community. This is particularly important, if migration of people into or out of area or part of the area is considerable. The best way in such cases is to convert the absolute number of cases into rates. Rates take the changing population size over time into account. The following data and graph illustrate this point. Now finally, it is possible to understand the true impact of the programme interventions.

Increased population in catchment area

Year reported	1987	1988	1989	1990	1991
Resident cases	90	90	95	95	100
Catchment Population	10000	12000	14000	16000	18000
Rate in residents (per 1000)	9	7.50	6.79	5.94	5.56

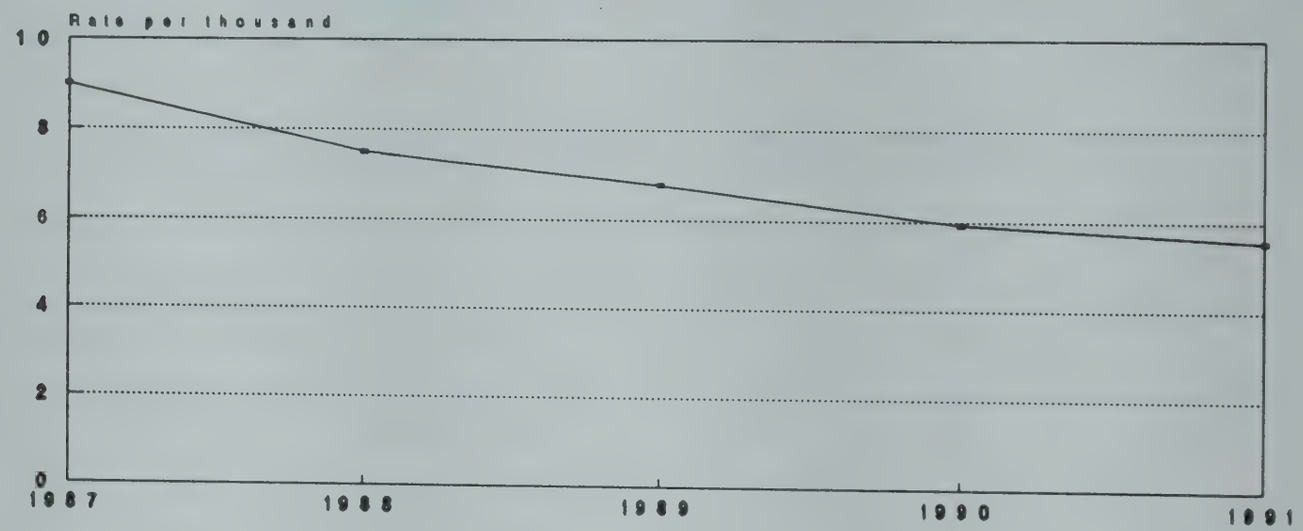


Figure 16 : Diarrhoea rate in resident population

The above discussion on deaths due to diarrhoea demonstrates the concept of epidemiological surveillance, the methods commonly used, the changing needs of surveillance during different stages of programme development and some of the problems in interpretation of data.

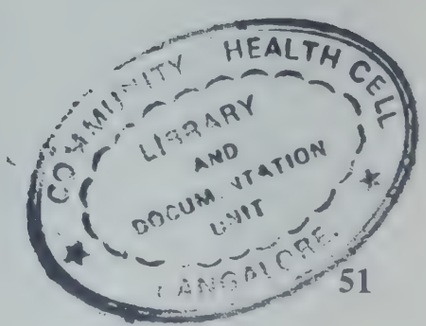
Remember Surveillance requires thoughtful and thorough analysis. Simple addition of number of cases reported by various institutions in the area does not give a true picture of the disease trends in the community.

3.2 REASONS FOR VARIOUS DISEASE TRENDS

Determine whether the disease incidence in an area is increasing or decreasing by reviewing your disease charts or graphs. Compare the number of cases reported in a particular month with the number of cases in previous months. Select one of the two sets of guidelines below to identify causes of the disease trend.

3.2.1 REASONS FOR INCREASE OR DECREASE IN DISEASE TRENDS

S.No.	Increasing trend	Decreasing trend
1.	Counting Errors	Counting errors towards lower side
2.	Increased reporting sites	Decreased reporting sites
3.	Regular reports complete	Irregular reports incomplete
4.	Seasonal variations	Seasonal variations
5.	Epidemic year	Non-epidemic year
6.	Decreased coverage level for immunization/services	Increased coverage level for immunization/service
7.	Different case definitions being used	Different case definitions
8.	Change in staff or procedure	Change in staff or procedure
9.	Increased non resident cases	Decreased non resident cases
10.	Increased awareness in the community	Community awareness better
11.	Poor water and sanitation status especially for water-borne diseases	Better water and sanitation status



Vaccine Efficacy can be determined in the following manner:

- Determine the **immunization status, sex and age** of cases from the health centre register.

- Then, calculate the percentage of all cases in immunized children, using the formula:

$$\frac{\text{No. of cases in immunized children}}{\text{All Cases (immunized plus unimmunized)}} \times 100 = \text{Percent cases in immunized children}$$

- A general rule is that if more than 10% of all cases were in children who were immunized, you may have a problem with vaccine efficacy.[7] Check the immunization services for any problems that might be responsible for an increase in the number of cases. Some of them could be:

  a) cold chain failure leading to poor vaccine quality
  b) incorrect immunization schedule followed by workers
  c) over-reporting of immunization coverage
  d) incorrect reconstitution/handling of vaccines

[7] As immunization coverage increases, higher proportion of cases occur in immunized children (could be more than 10%). For example, in an area with 100% coverage for measles vaccine all cases (100%) of measles above 9 months of age will occur in children who are already immunized. This could be either due to poor vaccine quality or biological/immunological variation of some children. For further details on vaccine efficacy see Annexure II.

EXERCISE E

In Exercise C, you plotted the cases of measles for a health centre. In this exercise, you will use that information to:

1) Determine whether the disease trend for measles at the health centre is increasing or decreasing, and

2) Identify the reasons for the trend.

To do this, read the results below of an inquiry conducted by the health centre medical officer. Think about reasons for the disease trend, following the steps just described in the preceding pages. Then record the answer to the question, "What are the possible explanations for the increased/decreased number of cases, compared to last month?"

The results of the inquiry at the health centre are as follows:

The health centre medical officer checked the patient register to make sure that all cases were recorded accurately and found no problems.

A review of immunization records showed that fewer children have received measles immunization every month for the past six months.

He noted that an increase in measles cases occurred last year in December, January, February and March. However, the increase this year is greater than the increase noted last year.

He also observed that a health worker immunized a 5-month-old child with DPT 3 and measles at the same time. When he asked the health worker why she gave measles vaccine to children who were too young, the worker replied that it was because so many children do not return at the age of 9 months for measles alone.

Finally, he checked health centre records to get the immunization status of all cases and found that 12% of all cases were in immunized children.

EXERCISE F

In this exercise you will practice filling a neonatal death investigation form. Follow the instructions below:

1. Review the neonatal death investigation form provided on page 55.

2. Decide if this is a case of neonatal tetanus and if the case could have been prevented. Give at least 5 ways on how it could have been prevented.

3. Identify 5 steps you will take in your PHC/District to prevent similar deaths from occurring.

See the facilitator when you are ready to discuss your answers

Form No. 13

National Child Survival & Safe Motherhood Programme

Investigation of Neonatal Deaths

To be completed by the Medical Officer on all infants who died within the 1st month of life (a separate form for each neonatal death).

I. General Information

1. State/U.T Uttar Pradesh
2. District Chandpur
3. Town (Mohalla)/PHC (Villaage)/Ward Nirula
4. Physician's name Dr. Ram Prasad
5. Date of investigation 17th Nov, 91

II. Background Information on Neonatal Death

1. Name of Child Mohan
2. Sex Male
3. Father's Name Shiv Krishna
4. Address of child 10/1 Vidya Nagar Road, Nirula,
5. Date of birth of child 13 th Nov'91
6. Person interviewed by the Investigator Shiv Krishna
7. Relationship of person interviewed to child Father
8. Date of death of child 16th Nov, 91.

III. Mother's Immunization History

1. Does the mother know about vaccination with TT? YES (NO)
2. No of doses received during this pregnancy? (0) [1] [2] [3]
3. Date of last dose of TT —
4. Card entry verified YES (NO)

IV. Infants Care since Birth (please circle appropriate answer)

1. Where was the child delivered? Hospital/Health Centre/Home/In the Fields/Other (please specify) _____
2. Who delivered the child ? Doctor/LHV/ANM/Tr.TBA/Untr Dai/Family members/Other (please specify)_____
3. How was the cord cut? Sterile / (unsterile (unboiled) Instrument
4. How was the cord dressing done? (use code) + (a=oil, b=cowdung c=gentian violet, d=antibiotic, e=none and f=other)
5. When the child became ill, who treated the child? (use code) ++ (a=govt. health centre, b=reg physician (allopathic/ayurvedic/homeopathic), c=unregistered physician and d=no treatment received)
6. When was the child initiated on breast-milk? within 2 hrs / 2-4 hrs / 4-8 hrs / 8-24 hrs / (24-48 hrs) / > 48 hrs

V. Symptoms preceding infant's death (please circle appropriate answer)

1. Was the infant able to suck the milk after birth? (YES) NO
2. Did the infant stop sucking milk when illness began? (YES) NO
3. Did the infant have a fever? YES (NO)
4. Did the infant have convulsions? (YES) NO
5. Was the infant noted to be stiff? (YES) NO

VI. Other Information on Mother

1. Is the mother alive? (YES) NO
2. If dead, date of death —
3. Symptoms preceding death —

VII. Medical Officer's Diagnosis

1. Cause of Neonatal Death Neonatal Tetanus
2. Cause of Mother's Death _____

Date of Reporting: 18th Nov 91 Investigator's Name: Jaya

3.3 ANALYZE DATA FROM SENTINEL REPORTING SITES

The district health officer uses data from sentinel sites to:

* Compare data from the routine reporting sites with data from sentinel sites in the same area to determine how well the routine reporting system is working.

* Determine whether there is a shift in the age groups affected by a disease.

* Calculate vaccine efficacy (see Annexure II).

In addition, data from sentinel surveillance will allow you to obtain and analyze data on cases and deaths in different age groups as well as relate them to the protection levels i.e. by immunization and vitamin A prophylaxis.

3.3.1 Compare data obtained from routine reports data with that of sentinel reports

Since sentinel data are more elaborate and likely to be complete when compared with those from routine reports, you can use them to learn about problems with the routine reporting system.

EXAMPLE:

Sentinel site B reports a sharp increase in measles cases and the routine reporting sites report only a slight increase. The district supervisor visits the routine reporting sites and comes to the conclusion that several sites are not reporting every diagnosed case. In this situation, the district supervisor learns two things:

First, that there is probably a significant increase in the number of cases of measles; and

Second, that health centre medical officers are having difficulties with surveillance activities and may need additional training or increased supervision.

3.3.2 Determine whether there is a shift in the age groups affected by a disease

As immunization coverage increases, you will see an increasing number of cases occurring in older children. This is because vaccines are never 100% effective, and the number of people who were immunized but not protected (due to vaccine failure) will gradually accumulate over time. Thus, there will be an increased number of cases in older individuals.

Since sentinel reports contain information about the number of cases in both children below and above 5 years of age, you can use this data to determine whether there is a shift in the age group affected by a disease. This can be done by comparing the

number of cases in the relevant age group at a particular period with the number of cases in the same age group at an earlier period.

3.3.3 Calculate vaccine efficacy

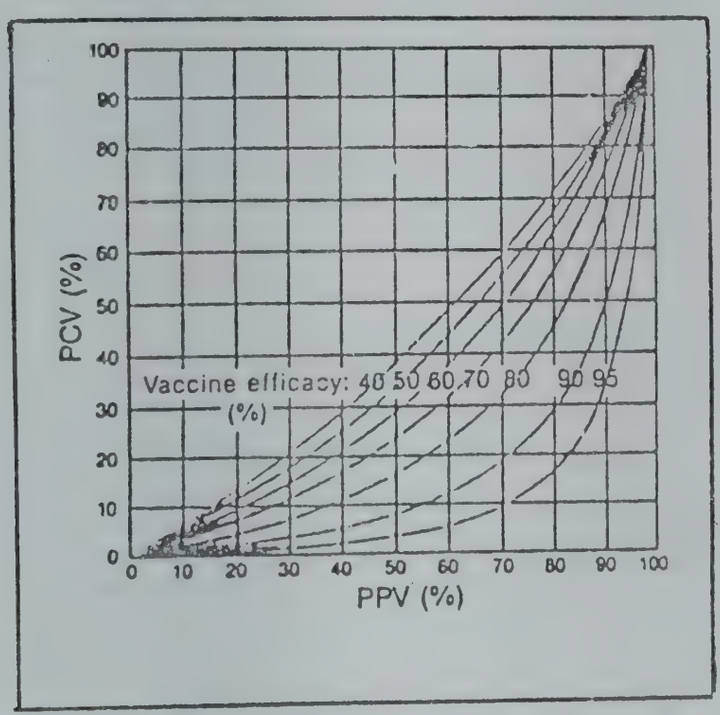
Vaccine efficacy provides information on the ability of a vaccine to prevent disease when used in routine immunization services. District health officers may calculate vaccine efficacy at the end of the year, using sentinel data, when evaluating the immunization services. A simple method for determining vaccine efficacy is described here.

Vaccine efficacy is measure by calculating the attack rates among immunized and unimmunized persons and determining the percentage reduction in the incidence rate of disease among immunized persons relative to unimmunized persons. The basic formula is:

$$VE = \frac{ARU - ARV}{ARU} \times 100$$

(VE = vaccine efficacy ; ARU = attack rate in the unimmunized population ; ARV = attack rate in immunized population.)

This eqauation can be manipulated to give the curves shown, which can be used to estimate vaccine efficacy



Percentage of cases immunized (PCV) per percentage of population immunized (PPV),for 7 values of vaccine efficacy

Another method for calculating vaccine efficacy is given in Annexure II

3.3.4 Retrospective analysis of data from sentinel centres

In the annexures V a to c are given the formats for carrying out retrospective analysis of information from sentinel sites. These are :

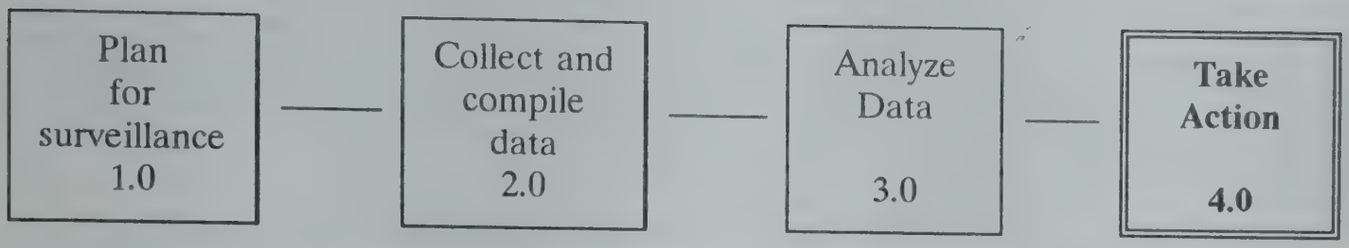
V a Cases of vaccine preventable diseases
V b Cases of diarrhoeal diseases and pneumonia and
V c Maternal deaths and their causes

Every attempt should be made to analyse the complete information for the year on these formats and obtain additional information related to sub-groups of age and relate the incidence of diseases to the protection status of children. Further, analysis of the complications in pregnancy or labour which have resulted in maternal deaths will help you to identify the training needs, set priorities in terms of infrastructural development and resource mobilization for your hospitals.

3.3.5 Classify your district and take action for polio eradication

Your district is	Incidence per 100,000 popn.	Coverage with OPV 3	Surveillance system	Area specific action
Polio Endemic	>1 or	<80 % or	inadequate	o Increase immunization coverage with OPV3 o Mop-up action in subcentre/wardarea with clustering of polio cases/other high risk pockets
Polio Control	<1 and	>80 % and	reliable	o Sustain high coverage o Identify and eliminate high risk pockets by mop-up action in concerned blocks o Mandatory and immediatenotification of cases to local health authority by messenger, telephone or telegram o Containment measures within 48 hours in concerned blocks/ward o Surveillance of Acute Flaccid Paralysis o Virus isolation of hospitalized cases o Confirmation of residual paralysis after 60 days
Polio Elimination	zero for last one year and	>80% and	reliable	o sustain high coverage o identify and eliminate high risk pockets by mop-up action in concerned blocks o mandatory and immediate notification of all cases of AFP in children under 15 years to local health authority by messenger/phone/telegram o virus isolation of all hospitalized cases o containment measures in concerned block/ward within 48 hours if poliomyelitis suspected o assessment of clinical status and confirmation of residual paralysis 60 days after onset of paralysis
Polio Eradication	zero for last three years and	>85 % and	reliable	

4.0 TAKE ACTION



Surveillance is "data collection for action". Purpose of any action is to solve problems in programme implementation and reduce the number of cases of disease. Action may be necessary even if immunization or other services are working well. Congratulate your staff for a job well done and look for ways to improve services to reach the programme goals.

Identifying corrective action is a responsibility of health functionaries at every level. However, it is more important for prompt action at the level of health centre as it is at this level that child survival and safe motherhood services are delivered.

4.1 IDENTIFY PROBLEMS AND IMPLEMENT SOLUTIONS

When you analyzed surveillance data, you identified problems and answered the question, "Why did deaths or case(s) occur?" In this section, you will identify solutions by answering the question, "What can I do to prevent deaths or cases from occurring for the same reason in the future?" Solutions must address the cause of the problem(s).

When identifying problems, health centre staff should:

* identify possible solutions, and
* take immediate action.

PROBLEMS IN REPORTING - CAUSES AND SOLUTIONS

Report	Possible causes	Proposed action
An increase in the number of measles cases among immunized children from a health centre	* Refrigerator is too warm and the temperature is not recorded on a daily basis * Health workers give measles immunization to children before the recommended age	* Assign responsibility for maintenance of refrigerator and supervise the temperature records being maintained * Provide new vaccines * Train health workers to use the immunization schedule and strengthen community based surveillance
Number of reported cases of polio is increasing	* Cold chain failures occur * Improved reporting of cases on a good surveillance system * Decreased immunization coverage * Refugees enter the area	* Repair the cold chain * Congratulate health workers for improved reporting * Increase immunization coverage * Immunize the children of the refugees
Number of reported cases increases sharply	* New outreach by health workers results in more cases seen * Health workers do more follow-up on drop-outs and see more cases * An increase is expected according to the epidemic pattern * Possible outbreak is occurring	* If increased number of cases reflects better surveillance, congratulate health workers * Increase immunization activities to reduce the impact of the epidemic pattern * Gear your system for better disease control measures * If polio outbreak, immediately notify your supervisor
Cases of neonatal tetanus occur in babies born to : **a) Unimmunized mothers** **b) Immunized mothers**	* Mothers receive antenatal care but are not immunized with Tetanus Toxoid * Mothers are visiting the health centre for reasons other than immunization and are not immunized * Vaccine exposed to room temperature for too long	* Ensure 5 cleans for delivery * Train health workers to immunize women when they come for antenatal care and for other reasons, and to immunize all women of child bearing age * Support and encourage health workers * Ensure quality of vaccine by following cold chain requirements
Reported cases of measles and pertussis are decreasing	* Fewer surveillance reports are received * Immunization coverage increases, therefore there are fewer cases	* Investigate to find out the decrease is due to less reporting or a real decrease in disease * Strengthen community based surveillance * If appropriate, congratulate health workers.

Every health centre and district will identify various solutions, depending on the policies, available resources and the creativity of the health staff. To assist you, the chart on the previous page outlines some solutions for common problems, and causes.

4.2 SUBMIT SURVEILLANCE REPORT

After analysis of surveillance data and taking action, send a report to your supervisor. The health centre medical officer will submit a report to the district health officer and the district health officer to the regional or national level.

Health centre medical officer should submit a copy of all completed neonatal tetanus death investigation forms to the district office.

Remember! As an efficient strategy for polio eradication, you should report every case of polio immediately. Do not wait until the end of the month.

4.3 PROVIDE FEEDBACK

Information must be shared promptly with all health functionaries involved in the surveillance system, regardless of what the analysis shows. However, feedback, often remains a neglected activity. Feedback shows that information reported is used and appreciated. Thus, feedback will improve accuracy, timeliness and completeness of reports and raise the morale of your staff.

Feedback includes:

* comments on timeliness, completeness and accuracy of reports
* information on the total number of cases of each disease in the district
* comparisons of data from different geographical areas
* information on the effectiveness of services
* suggestions for improving reporting
* information that will be helpful in solving problems
* information on action taken
* words of encouragement for a good job done or to do better

Methods of providing feedback include:

* supervisory visits to health centres
* monthly or quarterly newsletters
* periodic meetings
* telephone calls
* letters
* discuss with functionaries visiting your office for administrative issues
* any other time you meet the concerned functionaries

EXERCISE G

Vaccine preventable diseases are widespread in the unimmunized communities. It has been estimated by WHO that 80% of children will suffer pertussis, 90% measles if unimmunized.

Sample surveys conducted in 1981 and 1982 in India revealed the annual incidence of poliomyelitis and neonatal tetanus mortality as indicated in Annexures III & IV.

Your PHC has a population of 30,000. Birth rate is 30/1000 and IMR is 100/1000 live births. The reported coverage in your area is 60% for 2 doses of tetanus toxoid to pregnant women, 70% of infants with 3 doses of OPV, and 65% with measles. Herd immunity is not taken in account.

Now answer the questions below:

1. How many cases of neonatal tetanus, polio, whooping cough and measles would you expect in your area if there was no immunization programme?

2. How many cases of the above diseases would you expect assuming that the coverage given above is correct?

EXERCISE II

Answer the following questions in the space provided. Then share your answers with others in a group discussion. (Some of these questions are for health centre medical officers. If you are district health officer and the question does not apply to you, describe what health centres in your area should do.)

1. Do you prepare disease maps? If yes, for which diseases? If not, what are the reasons for not preparing them?

2. Do you prepare disease charts? If yes, for which diseases and over what period of time? If not, what are the reasons for not preparing them?

3. Do you investigate all cases of neonatal deaths that are reported to your health centre? If not, why?

   If you do investigate every case, do you collect complete information on every case that is listed in section 2.1.2 of this module? If not, what is not collected? and why?

   What will you do to prevent cases of neonatal tetanus in your area?

4. Do you identify disease trends for diarrhoea, pneumonia and vaccine preventable diseases every month? If not, why?

5. Do you investigate maternal deaths? What are the two most common causes of maternal deaths in your area during the last one year?

6. Do you use surveillance data to identify action you will take? If yes, give two examples. If not, why?

See the facilitator when you are ready to discuss your answers

5.0 INVESTIGATE AND CONTROL OUTBREAKS

The primary purpose of investigating an outbreak of diarrhoeal disease is to limit its spread to other areas and to prevent such occurrences in future. To control the epidemic the interventions must be selective, effective and at optimum cost.

What is the difference between a case investigation and an outbreak investigation?

An outbreak investigation is the compilation of many case investigations along with additional analysis done with larger numbers of cases. In general, the process of investigation is similar. (Note: In case of poliomyelitis even the occurrence of a single case is to be treated as an outbreak)

Outbreaks do not generate "new" diseases but, by altering the environment **may** increase transmission of diseases which **already** exist in the region through:

* faecal contamination of water due to disruption of pre-existing utilities, especially sewage systems.

* disruption of normal ways of life and consequent disruption of personal hygiene

* increases in population density (overcrowding) with poor hygiene and sanitation - a major risk in already densely-populated areas and in temporary camp settlements

* population movements - migrants bringing new diseases into an area or themselves being exposed to diseases to which they have no natural resistance

* the disruption of pre-existing control programme

* the creation of environments unusually favourable to transmission of disease such as rains, floods etc.

5.1 DIARRHOEAL DISEASES

Epidemiological features and criteria for diagnosis

It is necessary to know the standard case definition and epidemiological features of diarrhoeal diseases before investigating an outbreak.

5.1.1 What constitutes an outbreak

An outbreak or epidemic of diarrhoeal disease occurs when the number of cases are clearly in excess of expected numbers. When you compare the number of cases with those that occurred in the previous month or in the same month of the previous years, you can detect outbreak. Care must be taken that they are not due to completeness of reporting and variation in the number of reporting sites, geographical size of the catchment area, size of the population etc.

Criteria for number of cases which constitute an outbreak:

States and districts should establish criteria on the number of cases which constitute an epidemic based on their local situations. For example:

* a 25% increase in the number of cases reported as compared to the corresponding period (month or quarter) of the previous year.

* a 25% increase in the number of cases reported as compared to the average of cases over the last four years.

The sentinel reporting centres and medical officers in the out-patient clinics should be encouraged to be vigilant and report at the earliest without even waiting for the end of the month.

5.1.2 Confirmation of diagnosis

First reports of outbreaks may often come from the general public, lay press, or peripheral health workers. It is based primarily on history. The diagnosis should be confirmed by a medical officer based on history and clinical investigations and if possible with laboratory support. Important laboratory tests include stool microscopy, stool culture and sensitivity for various antibiotics.

5.1.3 Process of investigation

Once an outbreak is confirmed formal investigation should follow. Manpower, time and financial resources for the investigation must be agreed upon by you and your supervisors at district/state level.

Field investigation:

Identify and record the number of diarrhoea cases. Active surveillance is necessary to obtain accurate and complete information. This may include house visits, visits or telephone calls to the medical facilities and "line-listing" must continue till the outbreak is over.

Line-listing is listing of all cases that meet the criteria of a standard case definition with the relevant data in a standardized manner.

With the assistance of clinicians and laboratory support, sufficient number of stool specimen should be examined to identify and characterize the causative organism and monitor its antibiotic susceptibility pattern.

If a cholera epidemic is suspected appropriate fresh transport media must be provided to all health facilities to collect stool specimen for investigation, eg. Venkataraman-Ramakrishnan (VR) medium and alkaline peptone water. If no medium is available a sterile cotton rectal swab should be soaked in the liquid stool, placed in a sterile plastic bag, tightly sealed and sent to the testing laboratory immediately.

Once the presence of Cholera has been bacteriologically confirmed, it is not necessary to culture stools of all cases or contacts.

REPORTING FORMATS IN USE DURING OUTBREAKS

List of cases of diarrhoea

Sl. No.	Name	Age	Sex	Address	Diagnosis	Date of onset	Remarks/ outcome

* Mention date of death in case of death as outcome of the illness.

Weekly distribution of cases and deaths

Sl.No.	Week ending	No. of cases	No. of deaths
	Total		

Age and sex distribution of cases

Sl. No.	Age Group	Male No.	Male Percentage	Female No.	Female Percentage	Total No.	Total Percentage
1.	0 - 6 months						
2.	6 - 11 months						
3.	12 - 13 months						
4.	24 - 59 months						
5.	5 - 9 years						
6.	10 - 14 years						
7.	15 years and above						

5.1.4 Descriptive Epidemiology

Descriptive epidemiology will help defining population groups at high risk of disease in terms of age groups, geographical locations, source of water and breast-feeding status. You have already learnt, in the earlier pages, about the use of disease maps. During an outbreak of gastroenteritis, a disease map is very useful for a detailed analysis and action.

A detailed description of outbreak in terms of time, place and person has to be prepared.

a) Cases by time

During an outbreak the onset of illness in the cases should be plotted on a graph by days or weeks. This type of graph is commonly referred to as an epidemic curve. The epidemic curve will show peaks of disease separated by troughs during incubation period and may even suggest patterns or modes of transmission.

It is also useful to present previous year's information or possibly an average of previous years, for comparison on a line graph. Such graphs help to demonstrate the magnitude of the outbreak, and the spread of the disease as well as whether control measures are succeeding.

b) Cases by place

A map of the area or even a rough sketch showing the location of reported cases will indicate the geographical distribution of cases. In some situations, serial spot maps by week may provide insight into the pattern of spread of the disease over time.

c) Cases by person

Cases should be described in terms of age and sex.

Attack rate

It is appropriate to determine attack rates rather than absolute numbers because rates take into account variation in the population size of different age groups or similar factors. If there are 120 cases of diarrhoea among 6000 children below 5 years of age the attack rate is :

120/6000 = 0.020 i.e. 20 cases per 1000 children below 5 years of age

d) Cases by breast-feeding status

Diarrhoea cases or deaths among young children below two years can be described with reference to breast-feeding status (exclusive, partial or none at all).

e) Cases by source of water supply

Diarrhoea cases among different families who have got different sources of water supply will be epidemiologically important to know. Open water source like river, pond, shallow open wells are dangerous during an epidemic. Deep protected wells and tube wells are safe. Protected chlorinated running water supply will be the safest.

5.1.5 Control measures for diarrhoeal disease outbreak

a) Early case-finding and establishment of diagnosis. In a large outbreak it is necessary to rule out cholera and dysenteries which will require anti-microbial treatment in addition to rehydration measures.

b) Establishment of treatment centres :

* Oral rehydration therapy
* Promotion of home available fluids as soon as diarrhoea starts;
* Early recognition of dehydration and seeking ORS packets;
* Propagating use of ORS in the community; and ensuring availability of ORS packets in every village.
* Intravenous therapy

c) Preventive measures :

* Promote breast-feeding
* Improve weaning practices
* Measles immunization
* Use of plenty of clean water, chlorination and disinfection of sources of water supply
* Promote hand-washing
* Proper stool disposal
* Use of latrines

d) Role of Cholera vaccination

In the event of an outbreak of cholera, mass cholera vaccination has no role in controlling or preventing the disease occurrence. The protection levels are either too low or the time taken for antigenic response in the few who may be protected will be too long to be adopted as a strategy in public health. Please note that cholera vaccination has already been discontinued as a mandatory practice for travel, melas etc. including Khumbh mela.

e) Chemoprophylaxis

Mass Chemoprophylaxis has no role in an outbreak. However, it is given for household contacts and for close community living together. During Cholera epidemic tetracycline, doxycycline or furazolidone prophylaxis may be used.

5.1.6 Report results

The following is a suggested format for writing up the results of an outbreak investigation :

a) General Information :

State : _____
District : _____
Town/PHC : _____
Ward/Village : _____
Population : _____

b) Background Information:

Person reporting the outbreak: _____
Date of report : _____
Date investigations started : _____
Person investigating outbreak: _____

c) Details of Investigation:

Describe how the cases were found [may include: (a) house-to-house searches in the affected area; (b) visiting blocks adjacent to the affected households; (c) conducting record reviews at local hospitals; (d) requesting health workers to report similar cases in their areas, etc.]:

_____
_____
_____
_____

d) Descriptive Epidemiology:

* Cases by time, place and person (attach summary tables and relevant graphs and maps).
* Age-specific attack rates, mortality rates and complication rates.
* Source of water for consumption, occurrence of festivals, melas etc. in the community.
* High-risk age-groups and geographical areas.

e) Description of control measures taken:

Depending on the disease, all or some of the following may be applicable:

No. of households visited : _____
No. of children examined : _____
No. of cases treated : _____
No. of contacts of cases treated (if applicable) : _____
No. of children hospitalized : _____
No. of ORS packets supplied : _____
No. of wells chlorinated : _____
No. of villages with ORS packets available : _____

Mother's modules/educational camps : _____

f) Description of measures for follow-up visits:

_____
_____
_____
_____
_____
_____

g) Brief description of problems encountered (during outbreak investigations and control):

_____
_____
_____

h) Factors which, in your opinion, contributed to the outbreak (may include: contamination of public water supply, seasonal recurrence, local festival, common nursery/school, etc.):

_____
_____
_____
_____
_____

i) Conclusions and recommendations:

* For future outbreak investigations and control:

_____
_____
_____
_____
_____

* For improvement in water supply, sewerage, excreta disposal etc. to minimize recurrence of outbreaks:

_____
_____
_____
_____
_____

Date

(Name and designation)

5.2 POLIOMYELITIS

5.2.1 Is an outbreak occurring?

An outbreak is occurring if the number of reported cases is in excess of what would be expected for time (season), place (district), or age-group. In areas where immunization coverage is more than 80%, even a single case should be treated as an outbreak.

5.2.2 When should a case/outbreak investigation be initiated?

Every case of suspected polio in your area must be investigated. However, isolation and type identification of viruses from such outbreaks and their comparison with previously endemic cases of poliomyelitis will help.

5.2.3 How should case/outbreak investigation be carried out?

Conduct investigation within 48 hrs. to cover the following aspects:

* confirm diagnosis using standard case definition.
* collect clinical and demographic information.
* collect information on immunization status and source of immunization.
* collect laboratory specimens.
* enter data on line-listing forms.
* use the case investigation form for each suspected case (Form No. 12)
* arrange for follow-up to determine clinical outcome and to collect convalescent serum specimen.

In an outbreak, conduct these additional activities:

* assess/review immunization status of the community.
* make time graph showing cases by day or week of onset.
* map geographic distribution of cases.
* summarize information on cases - age, sex, immunization status.
* Calculate vaccine efficacy (use the method given under section 3.3.3 or the method described in Annexure II)

5.2.4 What data analysis should be performed?

Data from case investigation forms and line-listing should be analyzed in order to provide a descriptive picture of the outbreak and to determine whether standards for outbreak investigation and control are being met. Data should be analyzed by:

* Age/sex

  The age/sex distribution of cases is useful for establishing which age groups to target for interventions.

* Geographic location

  Cases should be plotted on a map according to their place of residence. These maps can be useful for coordinating activities (such as outreach immunization centres etc.)

* Source of notification

  This will help to determine whether improvements are needed in the surveillance system. For example, if cases are being reported only from rehabilitation centers, then additional clinic and hospital contacts may be required.

* Immunization status of cases

  Accurate information on the immunization cases of persons with poliomyelitis is essential for evaluating vaccine efficacy and possible cold chain problems.

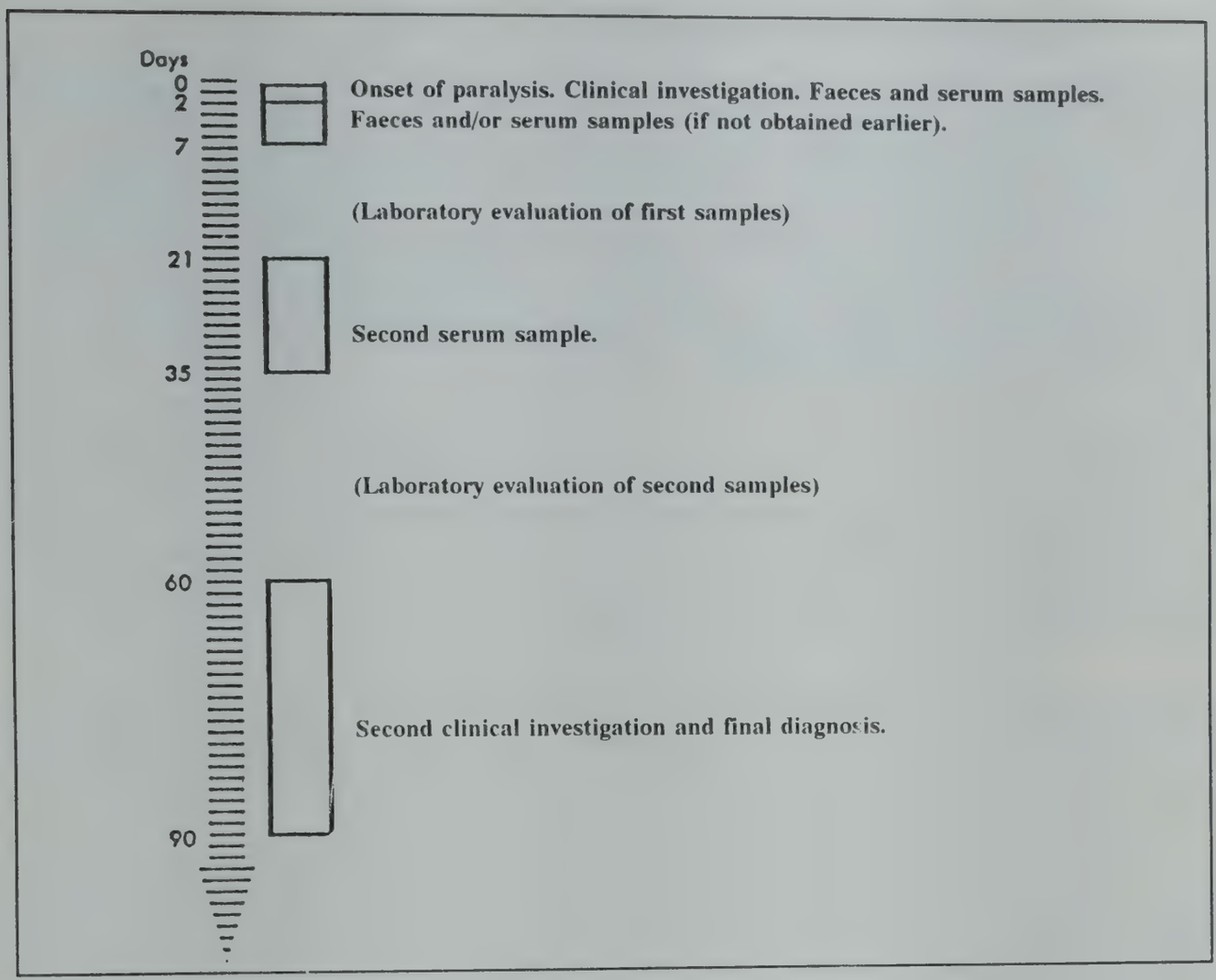
* Laboratory investigation

  This provides important information on the predominant type of poliomyelitis and whether outbreaks are related to one another.

* Time of onset

  Information on the time of onset of each case of poliomyelitis will provide important information about the epidemic pattern and should be plotted on a graph.

Guidelines for timing of case investigation of poliomyelitis



5.2.5 What laboratory investigations should be done?

Conduct laboratory investigation for representative endemic cases and for representative cases during outbreaks. The objectives of the laboratory investigation are to :

* Confirm that the paralysis is due to poliovirus
* Identify the type (1, 2, or 3)
* Identify whether the poliovirus is of wild or vaccine strain in origin.
* Determine intra-typic characterization.

5.2.6 How will you respond to outbreaks?

I If the district coverage for polio vaccine is 80 % or above

You will don containment immunization for units of 2000-3000 children in urban areas within 5 km in low density rural areas. This means that you will give one dose of OPV to all children below 3 years regardless of immunization status. Two such rounds of containment immunization 1 month apart will have to be conducted. The first round has to be completed within 1 week of onset of paralysis. There is no use in containment immunization if investigations reveal that more than one month has already elapsed from the onset of paralysis of last case. Also, the containment immunization activities will have to be carried out as a part of the fixed day schedule.

In addition, mopping up operations will also have to be carried out. These too will be done in the specified area as a part of the fixed day strategy. They will be done in the blocks or PHC areas where poliomyelitis cases were reported in the previous year. The mop-up rounds will be done in areas with relatively high coverage. Two such mop-up rounds at one month interval will have to be conducted and all children less than 3 years will have to be given the OPV regardless of their immunization status.

No records of children immunized through such containment immunization or mop-up rounds need to be maintained. Only tally-marking of the doses given will have to be done.

II If the district coverage for polio vaccine is less than 80 %

You will have to increase routine immunization efforts to increase coverage levels and organize special immunization activities such as catch-up rounds in blocks / areas where service delivery is weak or coverage levels are very low.

Please note that the best way to ensure complete immunization of all infants in the area is to plan for immunization sessions in every village every month and adhere to the fixed day strategy for delivery of services. As a programme manager you will have to monitor the adherence of your workers to the fixed day plans and support PHCs and their staff to carry out the programme as scheduled.

5.3 MEASLES

When you learn about measles outbreaks in any part of your PHC or district, you must remember that you will have to investigate such outbreaks primarily to identify the deficiencies in the implementation of the immunization programme. Special steps (such as training, re-enforcing the area with drugs etc.) will have to be undertaken to ensure good case management at home level and to educate mothers about complications that may arise e.g. pneumonia and diarrhoea. Health workers and medical practitioners of your area should be conscious of the post-measles complications which are the major causes of mortality. You should also ensure that the community based surveillance for various diseases of the programme is functioning properly. Measles immunization will be carried out in areas where you expect an outbreak. This will have to be done within 2 days of the first few cases of measles occurring in the area.

6.0 ADVERSE EVENTS FOLLOWING IMMUNIZATION

Adverse medical events do follow immunization occasionally. Such reactions are known and are difficult to avoid. It is important to make the communities understand, however, that the risk of these adverse reactions is small compared to the morbidity and mortality due to the vaccine preventable diseases.

Some of these unfortunate events are due to the intrinsic characteristics of vaccines. Some can be traced to the avoidable programme problems such as poor handling or administrative technique. Some occur just coincidentally due to other causes.

It is important to detect these adverse effects early enough to prevent recurrence. If allowed to continue, they will seriously undermine the credibility of immunization services and any other activities of the health functionaries in the community.

6.1 TYPES OF ADVERSE EVENTS

6.1.1. Vaccine-induced adverse events

Most of the commonly occurring adverse events are mild reactions and of short duration. Fever, rash and mild lymphadenopathy are systemic reactions in addition to the local reactions like redness, tenderness and pain at the injection site.

BCG vaccine gives rise to suppurative lymphadenitis in 1-2% of immunized children under 1 year of age. Extremely rare, but two serious complications following BCG immunization, are disseminated tuberculosis and osteitis.

Moderately severe events such as generalized seizures may occur following measles or DPT immunization. DPT immunization also gives rise to collapse (hypotonic hypo-responsive episodes). Recovery appears generally to be complete. Rarely measles vaccine associated encephalitis occurs and could possibly result in permanent disabilities.

A serious event is the acute encephalopathy or other neurological illness with sequelae following administration of Pertussis components of DPT. (Under such circumstances, subsequently needed doses of DPT are replaced with a dose of DT).

One should also remember that in the case of poliomyelitis outbreak in an area, any injection including OPT vaccine can precipitate an attack of paralytic poliomyelitis. However, one needs to be aware and rule out traumatic neuritis which may lead to spontaneous recovery in months depending on the seriousness of nerve injury.

Other complications are allergic reactions to the antigens themselves or other components such as egg albumin, antibiotics or preservatives.

6.1.2. Adverse effects due to programme errors

The most common manifestation is DPT-associated site abscess. They may be bacterial or sterile in nature.

Bacterial abscesses are due to contamination or incorrect management of sterilizing equipment, reuse of syringes and needles and/or inadequate field training and monitoring.

Sterile abscesses are a rare consequence of vaccines containing aluminium salts, particularly DPT. Although sterile abscesses normally may be seen once in 100,000 injections, inadequate shaking of the vaccine before use, subcutaneous injection and use of vaccine that has been frozen can increase the rate.

The vast majority of abscesses in the field are bacterial abscesses. Abscesses require prompt attention from health workers for adequate medical care. It is an "indicator" of poor programme implementation.

Sudden onset of severe watery diarrhoea, vomiting and fever within a few hours of measles vaccine administration which often lead to death has been reported. This condition is called Toxic shock syndrome caused by bacteria Staphylococcus aureus a contaminant in the measles vaccine when it is reused from opened vials the next day.

When vaccines are stored along with other drugs in the same refrigerators, use of dangerous drugs in place of vaccines or diluents to reconstitute vaccines take place.

6.1.3 Coincidental events

Vaccines are usually administered to children at an age when infections are common. Some adverse events reported may be coincidental only, the primary cause of the adverse event being unrelated to vaccine administration. Investigation is necessary to establish the caused relationship. It is important that children of the same age-group in the area who did not receive vaccines are also examined.

The state health authorities may be advised to have a standing committee of an epidemiologist, a paediatrician and a microbiologist on call to ensure prompt and thorough investigation of severe adverse events.

BCG vaccine should be used within three hours of reconstitution
Measles vaccine should be used within four hours of reconstitution

6.2 MEASURES TO MINIMIZE RISKS

The following measures will help minimize risks of adverse events following vaccination :

* Procedures for sterilization of syringes and needles should be scrupulously followed and monitored. Wherever feasible steam sterilization should be given preference over boiling.

* A single, sterile syringe and a single, sterile needle should be used for every injection.

* Measles vaccine should be used **within 4 hours** of reconstitution.

* Diluent for measles vaccine should be kept separate from other potentially harmful injectable drugs.

* Training programmes for all categories of personnel should receive the highest priority to ensure high quality of services.

* Reporting of abscesses by health workers in their areas should be made compulsory.

* Field monitoring of services should be regular and any deficiencies should be noted and corrected in a timely manner.

6.3 FIELD INVESTIGATIONS AND ANALYSIS OF REPORTS

The basic principles of field investigations of outbreaks can be adopted for investigation of adverse events. The first principle is to examine as many cases as possible to confirm diagnosis. All children immunized during the particular session should be followed up and relevant details entered in the line list of cases with adverse reactions. It is important that children not immunized of the same age-group in the locality are also examined to rule out coincidence.

An analysis of data should be made, by time, place and person in the same manner as in any epidemiological investigation. The details of children vaccinated may be summarized as shown in the table given here.

Number of children immunized, with reactions and number of deaths

Date of Immunization :

Vaccine	Number immunized	No. with reaction	Date(s) of reaction	Number died	Date(s) of death

Operational aspects of the programme need to be carefully reviewed with special reference to procedures followed for the collection, storage and issue of vaccines; methods adopted for sterilization of syringes and needles (including the total quantities of syringes and needles available for a session) and frequency and quality of routine field monitoring.

Where the adverse events are unexpected and not easily explainable, it is important that the signs and symptoms of each case are carefully noted. The **timeliness** and **completeness** of investigations is of prime importance. Check for use of reconstituted vaccine of BCG/Measles being transferred from session to session and used beyond the recommended hours.

Vaccine samples should be sent for testing to the national control laboratory. The samples should be packed properly in ice and sent by a courier. The forwarding note should clearly state the circumstances under which the sample(s) are sent. It is important that the used vial with the remaining vaccine is sent for testing along with unused vials of the same lot/batch.

A report on the suggested format given on page 84 on severe adverse events should be sent immediately to the concerned state and central officers so that a decision regarding possible holding or recall of the concerned batch of vaccine can be taken pending laboratory investigations.

6.4 MAKE A REPORT

A report should be prepared giving details on the investigations conducted. This report should start with general information regarding the place where the event occurred. The name of the state, district and PHC/ward should be clearly stated. The following points should be covered in such a report:

6.4.1 Cases

How and when were the first symptoms observed and who reported the event?
Who conducted the investigations and when were they begun?
How were the investigations conducted?
Number of children immunized and the type of reactions observed. The line list and summary tables should be attached to the report.
Whether any children of the same age-group in the area, who were not immunized, had similar symptoms.

6.4.2 Clinical aspects

* Detailed clinical picture
* Treatment given
* Outcome
* Diagnosis by clinicians and observations, if any made by them.

6.4.3 Operational aspects

How are immunization services generally provided in the area? Procedure followed on the day of the event?
When and from where the vaccines were received? How were the vaccines stored and transported?
How many syringes and needles are available and procedures followed for sterilization of the equipment?
Who administered the vaccines and what was the training they received?
Have similar reactions been observed in the past and were they reported?

6.4.4 Laboratory investigations

Samples sent for testing and the names of laboratories. The testing of the vaccine can take 2-4 months depending on the vaccine and the tests.

6.4.5 Suggestions and recommendations

What was the likely cause of the adverse event?
Measures recommended to minimize risks in future.

Date: **Name and designation**

6.5 DEALING WITH THE PUBLIC AND THE MEDIA

Panic of people must be avoided. Accurate information must be provided in a timely manner to the news media regarding the numbers affected and the remedial measures taken.

There is often hue and cry when adverse events occur following immunization since it is perceived that the health worker has performed an act that has injured or killed an otherwise healthy child. It is important that the community's concerns are dealt with in a professional but sympathetic manner.

The press and other media can be made use of in soliciting cooperation of public for immunization. The government procedures for dealing with press should be followed and nominated government spokespersons must provide information.

REMEMBER ABOUT SURVEILLANCE !

PLAN for surveillance

The two major types of surveillance are :

* Routine reporting (including **community based surveillance**)
* Sentinel reporting

Other surveillance activities are :

* Case/outbreak investigation
* Special studies

COLLECT and compile data

To make sure your data is complete and accurate:

* Tally cases every day
* Prepare disease maps and charts
* Line list and investigate all cases of neonatal deaths
* Line list and investigate cases of poliomyelitis
* Line list all maternal deaths
* Total the number of cases at the end of every month.

Collect only as much information as will be used.

ANALYZE data

Identify disease trends and their causes :

* Completeness of reporting
* Seasonal variation
* Epidemic pattern
* Immunization coverage

Analyze neonatal death, poliomyelitis case investigation forms and review information obtained from sentinel surveillance centres.

TAKE action and give FEEDBACK

Identify the causes of problems and their solutions, where information is collected.

Implement solutions immediately.

Submit surveillance reports

Provide feedback.

ANNEXURE-I a

LIST OF LAME CHILDREN UNDER 5 YEARS

PHC/DISTRICT

Month of Report _____

Sl.No.	Name of the child	Address	Age/ Date of Birth	Sex	Date/Month/Year of onset of lameness	Immunization status*
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Probable Polio :

- o History of febrile illness
- o History of abrupt onset of weakness or paralysis
- o No progression of paralysis after the first three days
- o Paralysis not associated with trauma
- o Paralysis not present from birth or associated with mental retardation

* Number of OPV doses prior to illness. Check immunization cards or register, if available.

ANNEXURE-I b

LIST OF NEONATAL DEATHS

PHC/DISTRICT

Month of Report _____

Sl.No.	Name of the child	Address	Age/ Date of Birth	Sex	Date of Death	Immunization status*	Delivered by **	Diagnosis **
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								

Probable NNT :

- o Infant was able to suck after birth
- o Stopped sucking after few days
- o Convulsions
- o Stiffness
- o Fever

* Immunization status of mother in number of TT doses. Check immunization registers if available

** These columns will be filled in after the neonatal deaths are investigated using Form No.13.

ANNEXURE-I c

LISTING OF MATERNAL DEATHS

PHC/DISTRICT

Month of Report _____

Sl.No.			1	2	3	4
1.	Name					
2.	Name of Husband/Father					
3.	Address					
4.	Date of Death					
5.	Tetanus Immunization Yes/No					
6.	Date of Delivery or Abortion					
7.	Delivered or aborted by	Qualified medical person (QMP)				
		Trained TBA (TTBA)				
		Untrained person (UP)				
8.	Abortion spontaneous (SA)					
9.	Diagnosis					
10.	Complications					

Note : Items 1 and 4 will be filled in immediately on receipt of information and other items will be filled in after investigating the maternal death with the help of health workers and supervisors.

CALCULATE VACCINE EFFICACY

The term "vaccine efficacy" refers to the ability of a vaccine to prevent disease when used in routine immunization services. Formulae for calculating vaccine efficacy follow:

Calculate the efficacy of a single-dose vaccine :

In the example described below, the efficacy of measles vaccine is calculated, but the same process can be used to calculate the efficacy of other single-dose vaccines.

The efficacy of measles vaccine is calculated because under ideal conditions this vaccine has a high efficacy (around 90%) and is therefore an excellent indicator of the effectiveness of the immunization services. Experience has shown that:

* Immunization services with a measles vaccine efficacy of 90% are protecting children as effectively as possible against measles.

* A vaccine efficacy of 80-90% means that your vaccine is not as effective as it could be, but that there is not a major problem.

* A vaccine efficacy of less than 80% means that there is a problem with the vaccine. This could be due to problems with the cold chain, the injection technique, or the age at which health workers are immunizing the children, and you should take action to correct it.

To calculate vaccine efficacy, you will need to obtain the following information from health records:

* the size of your study population (which is children 12-23 months of age since these children were under one year of age in the previous year)

* the coverage with measles vaccine in children 12-23 months of age

* the number of cases of measles in immunized children 12-23 months of age

* the number of cases of measles in unimmunized children 12-23 months of age

Calculate vaccine efficacy for measles vaccine (or another single-dose vaccine) by following the steps below:

a. Identify the size of the study population (that is, children 12-23 months of age). This is equal to approximately 3% of the total population.

Total population in the area served	x .03	=	The size of the study population

b. Calculate the number of children in the study population who are immunized by multiplying the level of coverage with measles vaccine by the study population. (See the module, Evaluate Service Coverage, for details on how to calculate coverage).

Study population 12-23 months of age	Immunization coverage of population 12-23 months of age	=	Number of immunized children 12-23 months of age

c. Calculate the number of children in the study population who are unimmunized by subtracting the number who are immunized from the total study population.

Study population 12-23 months of age	Number of immunized children 12-23 months of age	=	Number of unimmunized children in study population

d. Calculate the attack rate in the immunized population by dividing the number of cases occurring in immunized children 12-23 months of age by the total number of immunized children in the study population.

To find the number of immunized cases, total the number of cases in immunized children 12-23 months of age reported in the patient register over the preceding, twelve-month period.

e. Calculate the attack rate in the unimmunized children by dividing the number of unimmunized cased 12-23 months of age by the number of unimmnized children in the study population.

$$\frac{\text{Number of cases in immunized children 12-23 months of age}}{\text{Number of immunized children 12-23 months of age}} = \text{Attack rate in immunized children}$$

To find the number unimmunized cases, total the number of cases in unimmunized children 12-23 months of age reported in the patient register for the preceding twelve-month period.

$$\frac{\text{Number of cases in unimmunized children 12-23 months of age}}{\text{Number of unimmunized children 12-23 months of age}} = \text{Attack rate in unimmunized children}$$

f. Calculate vaccine efficacy by using the following formula:

AR = attack rate

$$\frac{\text{AR in unimmunized - AR in immunized}}{\text{AR in unimmunized}} \times 100 = \text{Vaccine efficacy}$$

Calculate the vaccine efficacy of a multi-dose vaccine:

For public health routine, the important vaccine efficacy calculation to make is that of a full course of immunizations. This calculation compares those who are fully immunizd (according to the recommended national immunization schedule) to the unimmunized (that is, those children who have received no immunizations at all). One example would be to compare children who have received a full course of OPV compared to those that have received no OPV at all. For this purpose, the same formula described earlier in this section can be used.

Guidelines for calculating vaccine efficacy by dose for multi-dose vaccine can be obtained from the WHO country or regional office or from WHO headquarters in Geneva, Switzerland.

Below is an example of how to calculate the efficacy of measles vaccine, given the following information:

Population of health area : 45000
Measles immunization coverage in children 12-23 months of age : 36%
Number of measles cases in immunized children 12-23 months of age : 128
Number of measles cases in unimmunized children 12-23 months of age : 842

a.	45,000 Total population	x	0.03	=	1350 Study population 12-23 months of age
b.	1,350 Study population 12-23 months of age	x	0.036 Measles coverage	=	486 No. of immunized children 12-23 months of age
c.	1,350 Study population 12-23 months of age	−	486 No. of immunized children 12-23 months of age	=	864 No. of unimmunized children 12-23 months of age
d.	128 No. of cases in immunized children 12-23 months of age	÷	486 No. of immunized children 12-23 months of age	=	0.026 Attack rate in immunized children 12-23 months of age
e.	842 No. of cases in unimmunized children 12-23 months of age	÷	486 No. of unimmunized children 12-23 months of age	=	0.97 Attack rate in unimmunized children 12-23 months of age
f.	(0.097 Attack rate in unimmunized children	−	0.026 /) ÷ 0.097 100 Attack rate in immunized / Attack rate in unimmu. children	x 100	73% VACCINE EFFICACY

OPTIONAL EXERCISE

In this exercise you will calculate the efficacy of measles vaccine at a sentinel site. Follow the guidelines o previous pagsand record your answers on the worksheet provided below:

Information about health centre Hoshiarpur

Population of district : 30,000
Measles immunization coverage in children 12-23 months of age : 53%
Number of measles cases immunized children 12-23 months of age : 85
Number of measles cases in unimmunized children 12-23 months of age : 420

a. Total population x = Study population 12-23 months of age

b. Study population 12-23 months of age x Measles coverage = No. of immunized children 12-23 months of age

c. Study population 12-23 months of age — No. of immunized children 12-23 months of age = No. of unimmunized children 12-23 months of age

d. No. of cases in immunized children 12-23 months of age ÷ No. of immunized children 12-23 months of age = Attack rate in immunized children 12-23 months of age

e. No. of cases in unimmunized children 12-23 months of age ÷ No. of unimmunized children 12-23 months of age = Attack rate in unimmunized children 12-23 months of age

f. (Attack rate in unimmunized children — 100 Attack rate in immunized) ÷ Attack rate in unimmu. children x 100 = VACCINE EFFICACY

ANNUAL INCIDENCE RATE OF POLIOMYELITIS[1]

PER 1000 CHILDREN 0 TO 4 YEARS (Based on sample surveys 1981-1982)

State/UT	Incidence Rate per 1000 children	
	Rural	Urban
Andhra Pradesh	1.7	1.4
Gujarat	2.5	2.2
Haryana, Punjab	3.1	1.7
Chandigarh	--	--
Karnataka, Goa	1.2	1.2
Madhya Pradesh (Bhopal & Jabalpur Divisions)	1.9	1.7
Maharashtra	1.4	1.3
Orissa	0.8	0.7
Rajasthan (Jaipur Division)	3.1	2.5
Tamil Nadu & Pondicherry	1.9	2.1
Uttar Pradesh (Allahabad Division)	2.3	1.6
West Bengal	0.8	1.0
Delhi	--	1.6
ALL INDIA	**1.7**	**1.6**

1 This survey was carried out when the EPI programme was still in its infancy. Therefore, it is presumed that the above incidence rates for poliomyelitis will be true if immunization coverage in a population were near - zero.

ANNUAL NEONATAL TETANUS MORTALITY RATE[2]

PER 1000 LIVE BIRTHS (Based on sample surveys 1981-1982)

State/UT	Incidence Rate per 1000 children	
	Rural	Urban
Andhra Pradesh	6.8	2.7
Bihar	11.3	5.3
Gujarat and D & N Haveli	5.8	1.9
Haryana, Punjab	--	--
Chandigarh	8.4	3.1
Karnataka & Goa	5.1	1.6
Kerala	2.0	1.9
M.P. (Bhopal & Jabalpur)	20.4	1.4
Maharashtra	4.1	4.9
Orissa	8.6	2.0
Rajasthan (Jaipur Division)	13.5	3.4
Tamil Nadu & Pondicherry	4.9	--
UP (Allahabad)	66.7	15.3
West Bengal	11.9	0.5
Delhi	--	1.0
ALL INDIA	**13.3**	**3.2**

[2] This survey was carried out when the EPI programme was still in its infancy. Therefore, it is presumed that the above incidence rates for poliomyelitis will be true if immunization coverage in a population were near - zero.

ANNEXURE-V a

SENTINEL SURVEILLANCE REPORT - VACCINE PREVENTABLE DISEASES

Sentinel Centre _____
District _____
State _____
Month _____ Year _____
Disease[3] _____

Description	Cases			Deaths			Immunization status		
	M	F	Total	M	F	Total	Immunized[4]	Not immunized	Unknown
ess than 6 months									
6 - 11 months									
12 - 23 months (<2 years)									
2-5 years									
> 5 years									
Total									

ATE :

SIGNATURE

Note: Do not include a case of poliomyelitis, if history of onset is 3 months or more. All cases of brochopneumonia or severe diarrhoea who give a history of measles or pertussis one month prior to illness should be included under measles or pertussis.

---

3 Use this format for each one of the six vaccine preventable diseases - diphtheria, pertussis, tetanus, poliomyelitis, measles and tuberculosis; one form each for one vaccine preventable disease.

4 Immunized children should have received :

1 dose of Measles and BCG and 3 doses of DPT and OPV vaccines (last dose received at least 15 days before the onset of the disease).

ANNEXURE-V b

MONTHLY SENTINEL SURVEILLANCE REPORTS
Diarrhoea/Pneumonia

Sentinel Centre _____
District _____
State _____
Month _____ Year _____

Disease : Diarrhoea

Description	Cases			Deaths			Vitamin A Prophylaxis			Measles Immunization	
	M	F	Total	M	F	Total	Full	Partial	Not given	Given	Not given
less than 6 months											
6 - 11 m											
12 - 23 m											
2-5 yrs.											
> 5 yrs.											
Total											

Disease : Pneumonia

Description	Cases			Deaths			Vitamin A Prophylaxis			Measles immunization	
	M	F	Total	M	F	Total	Full	Partial	Not given	Given	Not given
< 2 months											
2 - 12 m											
1-5 yrs.											
> 5 yrs.											
Total											

Date :

SIGNATURE

ANNEXURE-V c

MONTHLY SENTINEL SURVEILLANCE REPORTS -
Maternal Deaths

1. Sentinel Centre :
2. District :
3. State :
4. Month & year of Reporting :
5. Total no. of deliveries in the year :
6. Total no. of maternal deaths :

Sl.No.	Maternal deaths	Causes	Number	Total
1.	Tetanus	Un-immunized mothers		
		Immunized		
2.	Bleeding	Ante-partum		
		Post-partum		
3.	Sepsis	Post-abortion		
		Post-delivery		
4.	Obstructed Labour	Ruptured Uterus		
		Not ruptured		
5.	Toxaemia of Pregnancy	With convulsions		
		Without convulsions		
6.	Anaemia associated	Severe <5 gm/100 ml		
		Moderate 5-9 gms/100ml of Hb		

Date :

SIGNATURE

ANALYSIS OF ANNUAL DATA FROM SENTINEL SURVEILLANCE -
Vaccine preventable diseases

Sentinel Centre _____
District _____
State _____
Year _____
Disease[5] _____

Total Paediatric attendance in the year

Description	Cases			Deaths			Immunization status		
	M	F	Total	M	F	Total	Immunized[6]	Not immunized	Unknown
less than 6 months									
6 - 11 months									
12 - 23 months (<2 years)									
2-5 years									
> 5 years									
Total									

DATE :

SIGNATURE

Note: Do not include a case of poliomyelitis, if history of onset is 3 months or more. All cases of bronchopneumonia or severe diarrhoea who give a history of measles or pertussis one month prior to illness should be included under measles or pertussis.

---

5 Use this format for each one of the six vaccine preventable diseases - diphtheria, pertussis, tetanus, poliomyelitis, measles and tuberculosis; one form each for one vaccine preventable disease.

6 Immunized children should have received :

1 dose of Measles and BCG and 3 doses of DPT and OPV vaccines (last dose received at least 15 days before the onset of the disease).

ANNEXURE-VI b

ANALYSIS OF ANNUAL DATA FROM SENTINEL SURVEILLANCE - Diarrhoea/Pneumonia

Sentinel Centre _____
District _____
State _____
Year _____ Total Paediatric attendance in the year _____

Disease : Diarrhoea

Description	Cases			Deaths			Vitamin A Prophylaxis			Measles Immunization	
	M	F	Total	M	F	Total	Full	Partial	Not given	Given	Not given
less than 6 months											
6 - 11 m											
12 - 23 m											
2-5 yrs.											
> 5 yrs.											
Total											

Disease : Pneumonia

Description	Cases			Deaths			Vitamin A Prophylaxis			Measles immunization	
	M	F	Total	M	F	Total	Full	Partial	Not given	Given	Not given
< 2 months											
2 - 12 m											
1-5 yrs.											
> 5 yrs.											
Total											

Date :

SIGNATURE

ANALYSIS OF ANNUAL DATA FROM SENTINEL SURVEILLANCE - Maternal Deaths

1. Sentinel Centre :
2. District :
3. State :
4. Year of Reporting :
5. Total no. of deliveries in the year :
6. Total no. of maternal deaths :

Sl.No.	Maternal deaths	Causes	Number	Total
1.	Tetanus	Un-immunized mothers		
		Immunized		
2.	Bleeding	Ante-partum		
		Post-partum		
3.	Sepsis	Post-abortion		
		Post-delivery		
4.	Obstructed Labour	Ruptured Uterus		
		Not ruptured		
5.	Toxaemia of Pregnancy	With convulsions		
		Without convulsions		
6.	Anaemia associated	Severe <5 gm/100 ml		
		Moderate 5-9 gms/100ml of Hb		

Date :

SIGNATURE

MOTHER-INFANT IMMUNIZATION CARD

DURING THE SECOND AND THIRD YEAR (12-36 MONTHS)

DATE — DPT-B

DATE — Polio-B

DATE — Vitamin A-2

DATE — Vitamin A-3

DATE — Vitamin A-4

DATE — Vitamin A-5

ial number

me of the pregnant woman

sband's name

ected date of delivery

use number Village/Ward

I.C./Town

o-centre/Clinic

me of the infant

x of the infant Date of birth

his part of the card should remain with the health worker

Health worker's signature

TEAR ALONG THE DOTTED LINE

II-III DURING THE SECOND AND THIRD YEAR (12-36 MONTHS)

DATE — DPT-B

DATE — Polio-B

DATE — Vitamin A-2

DATE — Vitamin A-3

DATE — Vitamin A-4

DATE — Vitamin A-5

THE IDEAL IMMUNIZATION SCHEDULE

FOR THE PREGNANT WOMAN:	
Early in pregnancy	T.T. – 1 (injection)
One month after T.T.-1	T.T. – 2 or T.T. booster (injection)
FOR THE INFANT:	
At 1½ months	B.C.G. (injection)
	D.P.T. – 1 (injection) and O.P.V. – 1 (dose)
At 2½ months	D.P.T. – 2 (injection) and O.P.V. – 2 (dose)
At 3½ months	D.P.T. – 3 (injection) and O.P.V. – 3 (dose)
At 9 months	Measles (injection)
At 16 to 24 months	D.P.T. Booster (injection) and O.P.V. Booster (dose)

- ☐ **Even if you are late for an injection/dose, you must still get it. Consult your health worker regarding this.**
- ☐ Please keep this card carefully.
- ☐ Whenever you come to the health centre, bring this card with you.
- ☐ After every injection/dose, get the date of receiving it recorded in this card.
- If the infant has been delivered in a hospital/clinic, she should be given the B.C.G. injection at birth.

● This part of the card should remain with the pregnant woman/infant's mother.

TEAR ALONG THE DOTTED LINE

MOTHER-INFANT IMMUNIZATION CARD

Serial number

Name of the pregnant woman

Husband's name

Expected date of delivery

House number Village/Ward

P.H.C./Town

Sub-centre/Clinic

Name of the infant

Sex of the infant Date of birth

NATIONAL IMMUNIZATION MISSION
Government of India

RECORD OF A.N.C. AND IMMUNIZATION DURING PREGNANCY

DATE A.N.C.–1	DATE A.N.C.–2	DATE A.N.C.–3
DATE IRON	DATE IRON	DATE IRON
DATE T.T.–1	DATE T.T.–2 (Booster)	

- The pregnant woman should regularly meet the health worker to get ante-natal check-ups (A.N.C.) done.
- Remember, it is important to get 2 T.T. injections or 1 T.T. booster injection, and to take 100 iron tablets in 3 months, during pregnancy.
- Remember that T.T.-2 (Booster) should be given at least 1 month before the expected date of delivery.

NATIONAL IMMUNIZATION MISSION
Government of India

INFANT IMMUNIZATION RECORD

I. DURING THE FIRST YEAR (0-12 MONTHS)

DATE B.C.G.		
DATE D.P.T.–1	DATE D.P.T.–2	DATE D.P.T.–3
DATE O.P.V.–1	DATE O.P.V.–2	DATE O.P.V.–3
DATE Measles' AND	DATE Vitamin A-1	

- Get all the injections/doses at the scheduled time and get them recorded here.
- Remember, there must be a gap of one month between every injection/dose of D.P.T./O.P.V.

Health worker's signature

NATIONAL IMMUNIZATION MISSION
Government of India

TEAR ALONG THE DOTTED LINE

RECORD OF A.N.C. AND IMMUNIZATION DURING PREGNANCY

DATE A.N.C.–1	DATE A.N.C.–2	DATE A N C –3
DATE IRON	DATE IRON	DATE IRON
DATE T.T.–1	DATE T.T.–2 (Booster)	

INFANT IMMUNIZATION RECORD

I. DURING THE FIRST YEAR (0-12 MONTHS)

DATE B.C.G.		
DATE D.P.T.–1	DATE D.P.T.–2	DATE D.P.T.–3
DATE O.P.V.–1	DATE O.P.V.–2	DATE O.P.V.–3
DATE Measles AND	DATE Vitamin A-1	

NATIONAL IMMUNIZATION MISSION
Government of India

ANNEXURE-VIII

INSTRUCTIONS FOR FILLING SUB-CENTRE MOTHER & CHILD CARE RECORD

1. This register has been developed for you to record all MCH activities of the sub-centre area.

2. Separaters are provided to separate the records of each village.

3. On the separaters fill in the details of the village.

4. Binding of the register is such that it will help you to insert extra leaves whenever required.

5. On the top of every page enter the year. For example enter 1992-93 for cases to be registered during 1st April 1992 to 31st March 1993.

6. Col.2

   During the field visit you should identify all pregnant women and register them in this column after giving a Serial No.

7. The same Serial No. should also be entered in the MCH Card. Please remember to indicate the year of registration in the card for example a case listed at S.No.2 in 1992-93 should be written on the card as 2/92-93.

8. Col.5

   The number of pregnancies the woman had including the present one should be entered.

9. Col. 10, 14 & 18

   While examining the pregnant women look for certain danger signs which may require your personal continuous supervision and/or referral. These danger signs are:-

   a. Anaemia
   b. B.P. above 140 mm Hg.
   c. Abnormal weight gain (>5 kg/month)
   d. First pregnancy with age less than 20 and more than 30 years
   e. More than 4 pregnancies
   f. Bleeding during pregnancy (APH)
   g. Ceasarian operation during previous pregnancy
   h. Abnormal/lack of movements
   i. Convulsion

   Please enter appropriate code from the above list.

10. Col. 19

Please choose the appropriate code from the following:

a. At home
b. At sub-centre
c. Other institution including private hospitals

11. Col. 20

Please enter appropriate code from the following on the basis of delivery conducted by:

a. Doctor
b. ANM/LHV/Nurse
c. Trained Dai
d. Untrained Dai and/or others (relations etc)

12. Col. 21

Choose the appropriate code from the following and enter in this column.

a. Mother and child healthy
b. Mother died
c. Child died
d. Dead child born

13. Col. 23

Please enter:

a. If the child was healthy upto 7 days;
b. If the child was healthy upto 28 days;
c. If the child dies within 7 days, and
d. If it dies after 7 days but before 28 days

14. You are aware that the primary vaccination i.e. one dose of BCG, three doses of DPT and OPV each, one dose of measles and the first dose of Vitamin A should be given before the completion of the first year of the child. Hence at Col.36 fill in the code as:

a. if primary immunization was completed before the first year of the child;

b. if primary immunization was not completed before the first year of the child.

MOTHER AND CHILD CARE RECORD

MOTHER'S RECORD

Sl. No.	Name of pregnant woman	Age	Husband' name & Address	Order of pregnanc	Expected Date of delivery	ANC-1				ANC-2					ANC-3			Place of delivery	Delivery attended by	Delivery outcome **
						TT-1 date	IFA Qty	Wt. Kg.	Danger Code *	TT-2/B Date	IFA Qty.	Wt. Kg	Danger Code *	Date	IFA Qty.	Wt. Kg	Danger Code *			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

MOTHER AND CHILD CARE RECORD

CHILD'S RECORD

REGISTRATION YEAR 199___

Weight at birth	Child was healthy upto 7 or 28 days	Name of the child	Date of Birth	Sex	Date of BCG	Dates of OPV Doses			Dates of DPT Doses			Date of Measles dose	Date of Vit. A 1st dose	Immun. * Status 1st year	Date of OPV-B dose	Date of DPT-B dose	Dates of Vit. A doses			
						1st	2nd	3rd	1st	2nd	3rd						2nd dose	3rd dose	4th dose	5th dose
22	23	24	25	28	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

ANNEXURE-IX

MONTHLY PHC REPORT

Reporting Date:_____

P.H.C._____District_____

State_____Month_____Year_____

Yearly Target I) Infants_____II) Pregnant Women_____

Number of Sessions a) Planned_____ b) Actually Held_____

A. SURVEILLANCE

Disease		Number Reported			
		For the Month		Cummulative Since April	
		Cases	Deaths	Cases	Deaths
Diphtheria Pertussis Neonatal Tetanus Tetanus (others) Poliomyelitis (Acute) Measles					
Under five years	Tuberculosis Pneumonia Acute Diarrhoea Dysentry				
Maternal Deaths (Repoorted) : Before Delivery During Delivery Within 6 weeks of delivery				[redacted]	

B. PERFORMANCE

			Dose	No.of Beneficiaries		Cummulative since April	
PREGNANT WOMEN	TT		1 2 B				
	IFA TABLETS	(Prophylactic) (Theraputic)		Initiated	Completed	Initiated	Completed
CHILDREN				Under 1Yr	Over 1 Yr	Under 1 Yr	Over 1 Yr
	B C G		1				
	O P V		1 2 3				
	D P T		1 2 3				
	MEASLES Vitamin A OPV Booster DPT Booster		1 1 1 1				
	Vitamin A		2 3 4 5	[redacted]		[redacted]	

CHILDREN	DT (5 Years)	1 2 B	[redacted]		[redacted]	
	TT (10 Years)	1 B	[redacted]		[redacted]	
	TT (16 Years)	1 2	[redacted]		[redacted]	

ANTE-NATAL CARE

Cases		During the month	Cummulative since April
Registered Institutional Deliveries Complicated Cases referred			
Domicilliary deliveries conducted by	HW(F)/LHV Trained Dais Others		
Condition of newborn at birth	Weight below 2,000 gm. Weight 2,000-2,500 gm. Weight 2,500 and above Weight not taken Still born		
Abortion			

C. SUPPLY POSITION

Vaccine/Drugs	Opening Balance	Received during the month	Consumed during the month	Balance at the end of month
DPT				
OPV				
BCG				
MEASLES				
TT				
DT				
Syringes 2 ml				
Syringes 1 ml				
Needles 20 G				
Needles 23 G				
Needles 26 G				
Immunization Cards				

D. STATUS OF EQUIPMENT (inlcuidng deep freezers, ILRs, voltage stabilizers, vaccine carriers, cold boxes, weighing machines, BP instruments, vehicles etc.)

Equipment/ Make	Machine Number	Whether working	If not, date of breakdown	Date of Intimation	Remarks*

* Please mention in this column:
a) If machine is beyond repair
b) If the machine has been attended to by the mechanic within a week of breakdown.

E. UNTOWARD REACTIONS

1. Reported deaths associated with immunization	
2. Number of absessess	
3. Other complications	

Date:

To:
The District M.C.H. Officer

Signature of Medical Officer

ANNEXURE-X

MONTHLY DISTRICT REPORT

Reporting Date:_____

No. of PHCs_____District_____

State_____Month_____Year_____

Yearly Target I) Infants_____II) Pregnant Women_____

Number of Sessions a) Planned_____ b) Actually Held_____

A. SURVEILLANCE

Disease		Number Reported			
		For the Month		Cummulative Since April	
		Cases	Deaths	Cases	Deaths
Diphtheria Pertussis Neonatal Tetanus Tetanus (others) Poliomyelitis (Acute) Measles					
Under five years	Tuberculosis Pneumonia Acute Diarrhoea Dysentry				
Maternal Deaths (Repoorted) : Before Delivery During Delivery Within 6 weeks of delivery				[redacted]	

B. PERFORMANCE

			Dose	No.of Beneficiaries		Cummulative since April	
PREGNANT WOMEN	T T		1 2 B				
	IFA TABLETS	(Prophylactic) (Theraputic)		Initiated	Completed	Initiated	Completed
CHILDREN				Under 1Yr	Over 1 Yr	Under 1 Yr	Over 1 Yr
	B C G		1				
	O P V		1 2 3				
	D P T		1 2 3				
	MEASLES Vitamin A OPV Booster DPT Booster		1 1 1 1				
	Vitamin A		2 3 4 5	[redacted]		[redacted]	
	DT (5 Years)		1 2 B	[redacted]		[redacted]	

CHILDREN	TT (10 Years)	1B	[redacted]		[redacted]	
	TT (16 Years)	12	[redacted]		[redacted]	

ANTE-NATAL CARE

Cases		During the month	Cummulative since April
Registered Institutional Deliveries Complicated Cases referred			
Domicilliary deliveries conducted by	HW(F)/LHV Trained Dais Others		
Condition of newborn at birth	Weight below 2,000 gm. Weight 2,000-2,500 gm. Weight 2,500 and above Weight not taken Still born		
Abortion			

C. SUPPLY POSITION

Vaccine/Drugs	Opening Balance	Received during the month	Consumed during the month	Balance at the end of month
DPT OPV BCG MEASLES TT DT Syringes 2 ml Syringes 1 ml Needles 20 G Needles 23 G Needles 26 G Immunization Cards				

D. STATUS OF COLD CHAIN EQUIPMENT

Equipment ILR/DEEP FREEZER	Total Supplied	Total not working	No. attended to within 1 week	No. not working for more than 1 month*	No.Beyond Repair
ILR 300 Litre Deep freezer 300 Litre ILR 140 litre Deep freezer 140 litre					

* Excluding those beyond repair.

Please attach details of beyond repair equipment as:

Location	Machine No.	Date of installation	Out of order since

E. UNTOWARD REACTIONS

1. Reported deaths associated with immunization 2. Number of absessess 3. Other complications	

Date:

District MCH Officer

To:

1. Monitoring and Evaluation Unit, Child Survival & Safe Motherhood Programme Division
   Ministry of Health & Family Welfare, Nirman Bhavan
   New Delhi 110011

2. State MCH Officer

DEFINITION OF TERMS

Attack rate	The percentage of individuals in a defined group who get a disease over a defined time period.
Case fatality rate	A percentage of the number of persons diagnosed as having a specific disease who die as a result of that illness.
Disease surveillance	The collection of information about the umber of cases of given diseases, and the use of that information to evaluate the effectiveness of the preventive immunization activities, and action taken to correct any problems which hinder disease-reduction objectives from being met.
Disease trend	The pattern formed by increases and decreases in the number of reported cases of disease over time.
Epidemic	The occurrence of a disease in a pattern in which more cases of a disease than usually occur in a specified period of time. Synonym: outbreak.
Epidemic pattern	The occurrence of a disease in a pattern in which more cases occur during certain months each year or with years' interval.
Immunization coverage	The proportion of individuals in the target population who are immunized.
Immunization coverage survey	A special study designed to measure the percentage of individuals in a given age group who are immunized.
Incidence	The number of new cases of disease in a defined population during a specified period of time.
Outbreak	The occurrence in a community or region of more cases of a disease than usually occur in a specified period of time. Synonym: epidemic.
Outbreak investigation	Studies conducted for the purpose of collecting data about an outbreak with the goal of controlling the disease outbreak and preventing similar outbreaks in the future.
Routine reporting site	A health facility that is designated to submit information on the number of cases of certain diseases that occur in the area.
Seasonal variation	The occurrence of a disease in a pattern where more cases occur in one (or more) season(s) of the year.
Sentinel reporting site	A health facility that regularly and completely submits information on the number of cases of certain diseases that occur in the area and also may include additional information such as the age and immunization status of each ccase.
Signs of disease	The evidence of disease found in a case by the examiner.
Special surveys	Studies that answer questions that cannot be answered by data obtained in the routine and sentinel reporting system.
Symptoms of disease	The sensation of disease felt by the patient.
Vaccine efficacy	The ability of a vaccine to prevent disease when used in routine immunization services.

CLINICAL OBSERVATION OF LAME CHILDREN

To be completed by the Medical Officer on all lame children between 0 and 5 years of age (a separate form for each lame child).

I. General Information

1. State/U.T._____ 2.District_____
3. Town (Mohalla)/PHC (Village) _____
4. Cluster No._____5. Line List No. _____

II. Background Information on Lame Child

1. Name of Child_____ 2. Sex _____
3. Father's Name_____ 4. Head of Household_____
5. Date of Birth of Child _____ 6. Address of Child_____
7. Person Interviewed _____
8. Relationship of person interviewed to child_____

III. History of illness resulting in Lameness of the child

1. Date of onset of lameness _____
2. Address of child at onset of lameness: a. Village_____
   b. District _____
   c. Outside district surveyed - YES/NO
3. Number of doses of polio vaccine received by child proceeding onset of lameness: (a) one, (b) two, (c) three, (d) more, (e) none.
4. Medical care during illness resulting in lameness (circle correct answer):

   a) Registered physician (Allopathic/Ayurvedic/Homeopathic)
   b) Health Centre
   c) Un-registered physician
   d) Other (please specify)

5. Did the child have fever at the time of the onset of lameness? YES/NO
6. Was the onset of the lameness acute? YES/NO
7. Did the lameness progress (increase) after onset? YES/NO
8. For how many days did it progress? Number
9. Any history of injury (including injections) prior to the illness? YES/NO
10. Mental retardation associated with lameness? YES/NO

IV. Physical Examination of child (Circle correct answer)

1. Paralysis of lower limb present YES/NO

2. Affected limb:

	Right	Left
Upper		
Lower		

3. Type of paralysis present Flaccid Spastic

4. Sensation in affected limbs Normal Impaired

5. Muscle atrophy (wasting) in affected limb

6. Gait-Normal/impaired/requires assistance - Unable to evaluate

V. Evaluation of Lameness (Circle appropriate answer)

1. Lameness not present 2. Lameness present
   a) Does not require mechanical aid to walk
   b) Requires mechanical aid to walk
   c) Unable to walk

VI. Physician's Diagnosis on Cause of Lameness

1. Poliomeylitis _____

2. Trauma (please specify) _____

3. Congenital deformity (Please specify)_____

4. Other (please specify) _____

Date of Investigation _____ Investigator's Name: _____

Form No. 13

National Child Survival & Safe Motherhood Programme

Investigation of Neonatal Deaths

To be completed by the Medical Officer on all infants who died within the 1st month of life (a separate form for each neonatal death).

I. General Information

1. State/U.T _____
2. District _____
3. Town (Mohalla)/PHC (Villaage)/Ward _____
4. Physician's name _____
5. Date of investigation _____

II. Background Information on Neonatal Death

1. Name of Child _____
2. Sex _____
3. Father's Name _____
4. Address of child _____
5. Date of birth of child _____
6. Person interviewed by the Investigator _____
7. Relationship of person interviewed to child _____
8. Date of death of child _____

III. Mother's Immunization History

1. Does the mother know about vaccination with TT? YES NO
2. No of doses received during this pregnancy? [0] [1] [2] [3]
3. Date of last dose of TT _____
4. Card entry verified YES NO

IV. Infants Care since Birth (please circle appropriate answer)

1. Where was the child delivered? Hospital/Health Centre/Home/In the Fields/Other (please specify)
2. Who delivered the child ? Doctor/LHV/ANM/Tr.TBA/Untr.Dai/Family members/Other (please specify)
3. How was the cord cut? Sterile /unsterile (unboiled) Instrument
4. How was the cord dressing done? (use code) + (a=oil, b=cowdung, c=gentian violet, d=antibiotic, e=none and f=other)
5. When the child became ill, who treated the child? (use code) ++ {a=govt. health centre, b=reg physician (allopathic/ayurvedic/homeopathic), c=unregistered physician and d=no treatment received}
6. When was the child initiated on breast-milk? within 2 hrs / 2-4 hrs / 4-8 hrs / 8-24 hrs / 24-48 hrs / > 48 hrs.

V. Symptoms preceding infant's death (please circle appropriate answer)

1. Was the infant able to suck the milk after birth? YES NO
2. Did the infant stop sucking milk when illness began? YES NO
3. Did the infant have a fever? YES NO
4. Did the infant have convulsions? YES NO
5. Was the infant noted to be stiff? YES NO

VI. Other Information on Mother

1. Is the mother alive? YES NO
2. If dead, date of death _____
3. Symptoms preceding death _____

VII. Medical Officer's Diagnosis

1. Cause of Neonatal Death _____
2. Cause of Mother's Death _____

Date of Reporting: _____ **Investigator's Name:** _____

Education is empowerment. Every girl and boy must be helped to complete atleast primary education in school. This will facilitate attainment of good health. In this endeavour all of us can contribute and make a difference.

You can make a big difference if you.....

- **ask every family you meet during your health work, whether their children are in primary school;**
- **persuade them to send all their children including girls, to attend and complete primary school, if they are not in school;**
- **identify the primary school teachers of the villages covered by you;**
- **facilitate communication between the family and the school teacher whenever possible;**
- **encourage all functionaries working with you to actively promote school attendance and completion of primary school; ask them regularly, what they have done;**
- **include a panel/discussion on primary education whenever you organize a health exhibition/camp.**